* STIC SEARCH *

Hertzog 10/693,476


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=> file reg
FILE 'REGISTRY' ENTERED AT 11:02:41 ON 05 NOV 2004
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=> display history full l1-

     FILE 'REGISTRY' ENTERED AT 10:05:55 ON 05 NOV 2004
L1        10676 SEA (N(L)H(L)MO(L)S)/ELS
                E AMMONIUM MOLYBDATE/CN
L2           74 SEA AMMONIUM#(A)MOLYBDATE#
L3           34 SEA L2 AND 4/ELC.SUB
L4           40 SEA L2 NOT L3
                E HYDROGEN SULFIDE/CN
L5            1 SEA "HYDROGEN SULFIDE"/CN

     FILE 'HCA' ENTERED AT 10:41:50 ON 05 NOV 2004
L6         4008 SEA L3
L7        97090 SEA L5 OR HYDROGEN#(W)(SULFIDE# OR SULPHIDE#) OR H2S
L8         4565 SEA L1
L9           21 SEA L6 AND L7 AND L8

     FILE 'REGISTRY' ENTERED AT 10:42:28 ON 05 NOV 2004
                E SULFUR/CN
L10           1 SEA SULFUR/CN
L11         228 SEA S/ELS (L) 1/ELC.SUB

     FILE 'HCA' ENTERED AT 10:47:47 ON 05 NOV 2004
L12      176708 SEA L10 OR L11 OR (ELEMENTAL? OR PURE# OR PURIF? OR
                FREE? OR UNBOUND? OR NONBOND? OR NON(A)BOND?)(2A)(SULFER#
                 OR SULFUR# OR SULPHER# OR SULPHUR# OR S)
L13           1 SEA L9 AND L12
L14           9 SEA L7 AND L12 AND L6
L15        5737 SEA AMMONI?(A)MOLYBDATE#
L16          10 SEA L7 AND L12 AND L15

     FILE 'REGISTRY' ENTERED AT 10:51:22 ON 05 NOV 2004
                E AMMONIUM THIOMOLYBDATE/CN
L17          99 SEA L1 AND 13/S
L18         119 SEA L1 NOT C/ELS
L19          15 SEA L17 AND L18
L20         509 SEA L1 AND 3/MO
L21          13 SEA L19 AND L20

     FILE 'HCA' ENTERED AT 10:54:19 ON 05 NOV 2004
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L22	59	SEA L21
L23	15	SEA L21/P
L24	16	SEA L22 AND (L6 OR L7 OR L12 OR L15)
L25	38	SEA (L14 OR L16 OR L23 OR L24) NOT L13
L26	16	SEA (L14 OR L16) NOT L13
L27	20	SEA L9 NOT (L13 OR L26)
L28	20	SEA (L23 OR L24) NOT (L13 OR L26 OR L27)

=> file hca
FILE 'HCA' ENTERED AT 11:04:03 ON 05 NOV 2004
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=> d l13 1 cbib abs hitstr hitind

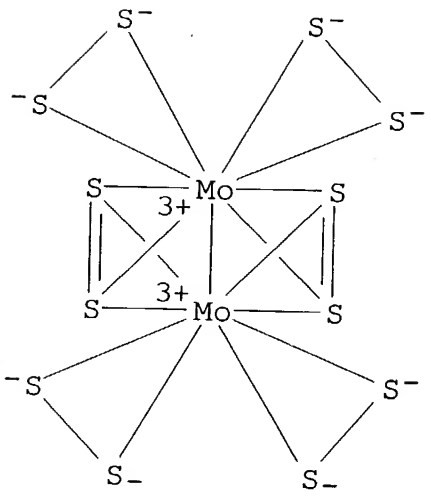
L13 ANSWER 1 OF 1 HCA COPYRIGHT 2004 ACS on STN
114:113911 Molybdenum-sulfur clusters. Mueller, Achim; Krickemeyer, Erich (Fac. Chem., Univ. Bielefeld, Bielefeld, D-4800, Germany). Inorganic Syntheses, 27, 47-51 (English) 1990. CODEN: INSYA3. ISSN: 0073-8077.

AB (NH4)2[Mo3S(S2)6].nH2O (n = 0-2) and (NH4)2[Mo2(S2)6].2H2O were prepd. individually and together from polysulfide solns. and (NH4)6[Mo7O24] or (NH4)2[MoO2S2] under different reaction conditions. The polysulfides were prepd. from S8 and **H2S** and NH3.

IT **65878-95-7P 79950-09-7P**
(prepn. of)

RN 65878-95-7 HCA

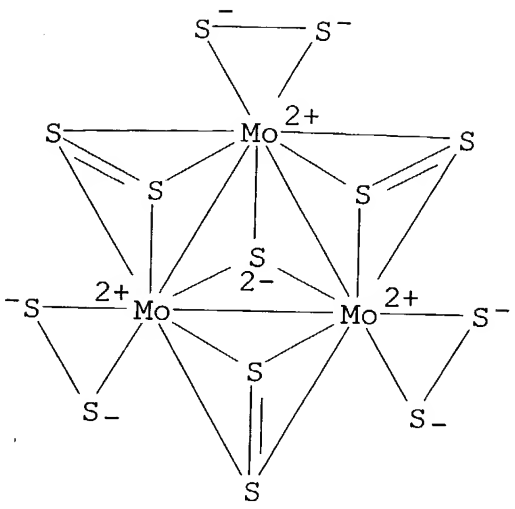
CN Molybdate(2-), bis[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tetrakis(dithio)di-, (Mo-Mo), diammonium, dihydrate (9CI) (CA INDEX NAME)



● 2 H_2O

● 2 NH_4^+

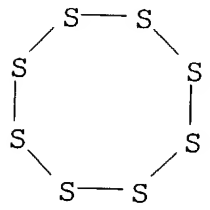
RN 79950-09-7 HCA
CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium, hydrate (9CI) (CA INDEX NAME)



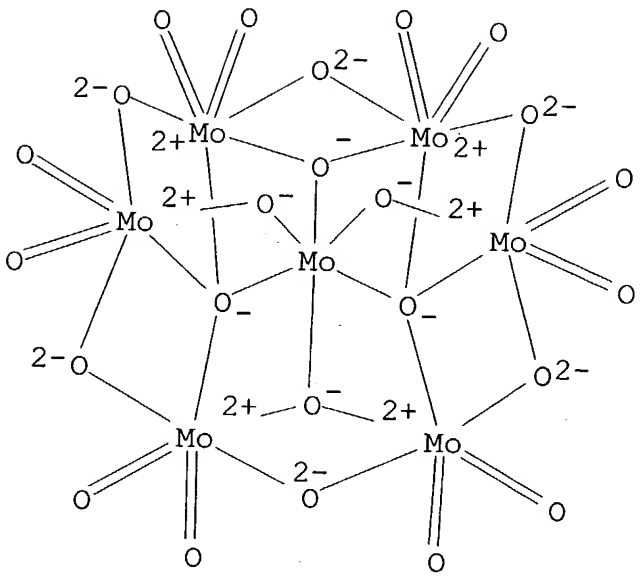
● x H_2O

● 2 NH_4^+

IT **10544-50-0**, Sulfur (S8), reactions
(reaction of, with **hydrogen sulfide** and ammonia followed by oxomolybdate or oxothioxomolybdate)
RN 10544-50-0 HCA
CN Sulfur, mol. (S8) (7CI, 8CI, 9CI) (CA INDEX NAME)

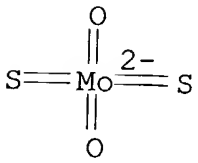


IT **12027-67-7 16150-60-0**
(reaction of, with polysulfide)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



●6 NH_4^+

RN 16150-60-0 HCA
CN Molybdate(2-), dioxodithioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
IT **65878-95-7P 79950-09-7P**
(prepn. of)
IT **10544-50-0**, Sulfur (S8), reactions
(reaction of, with **hydrogen sulfide** and ammonia followed by oxomolybdate or oxothioxomolybdate)
IT **12027-67-7 16150-60-0**

(reaction of, with polysulfide)

=> d l26 1-16 cbib abs hitstr hitind

L26 ANSWER 1 OF 16 HCA COPYRIGHT 2004 ACS on STN
141:209697 The hydrodesulfurization activity and characterization of cobalt Chevrel phase sulfides. Ooi, Shukeat; Zhang, Haibo; Hinode, Hirofumi (Department of International Development Engineering, Tokyo Institute of Technology, Meguro, Tokyo, 152-8552, Japan). Reaction Kinetics and Catalysis Letters, 82(1), 89-95 (English) 2004. CODEN: RKCLAU. ISSN: 0133-1736. Publisher: Akademiai Kiado.

AB Hydrodesulfurization activity of cobalt Chevrel phase sulfide catalysts was studied in a fixed-bed flow reactor. Single phase cobalt Chevrel phase sulfides exhibited catalytic activity for hydrodesulfurization. Supported cobalt Chevrel phase sulfides catalysts indicated much higher hydrodesulfurization activity and even higher than com. CoMoS/Al2O3 catalysts. The existence of Mo6S8 and the reduced oxidn. state of Mo in the cobalt Chevrel phase sulfides was obsd. by XRD, LRS, and XPS.

IT **7704-34-9**, Sulfur, reactions **7783-06-4**, **Hydrogen sulfide (H2S)**, reactions
(hydrodesulfurization activity and characterization of cobalt Chevrel phase sulfides)

RN 7704-34-9 HCA
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

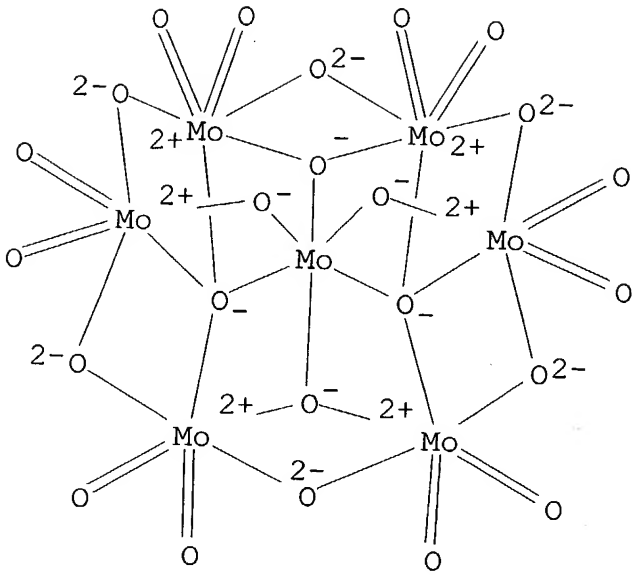
S

RN 7783-06-4 HCA
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

IT **12054-85-2**, Hexaammonium heptamolybdate tetrahydrate
(precursor; hydrodesulfurization activity and characterization of cobalt Chevrel phase sulfides)

RN 12054-85-2 HCA
CN Molybdate (Mo7O246-), hexaammonium, tetrahydrate (9CI) (CA INDEX NAME)



● 4 H_2O

● 6 NH_4^+

CC 51-6 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 22, 67, 75

IT 1333-74-0, Hydrogen, reactions **7704-34-9**, Sulfur, reactions **7783-06-4**, **Hydrogen sulfide (H2S)**, reactions
(hydrodesulfurization activity and characterization of cobalt Chevrel phase sulfides)

IT 10026-22-9, Cobalt nitrate, hexahydrate **12054-85-2**, Hexaammonium heptamolybdate tetrahydrate
(precursor; hydrodesulfurization activity and characterization of cobalt Chevrel phase sulfides)

L26 ANSWER 2 OF 16 HCA COPYRIGHT 2004 ACS on STN
138:257592 Hydrogenation of coals from the Yerkovetsk field to obtain liquid fuel. Maloletnev, A. S.; Krichko, A. S.; Golovin, G. S.; Pyataev, D. A. (Inst. Goryuchikh Iskopaemykh, Russia). Khimiya Tverdogo Topliva (Moscow, Russian Federation) (6), 40-50 (Russian) 2002. CODEN: KTVTBY. ISSN: 0023-1177. Publisher: Nauka.

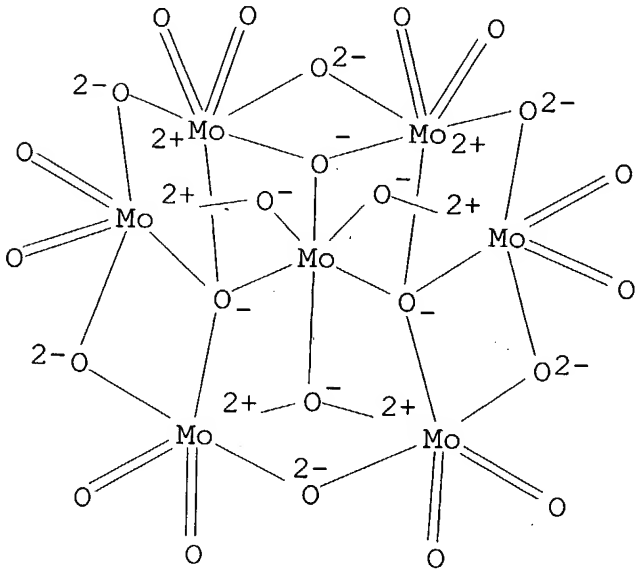
AB The feasibility of Yerkovetsk field coal of the Amursk region for use as raw materials for liq. fuel from low pressure hydrogenation was tested and results are presented. Brown coal from this field is from a reservoir in mountainous geol. deposits, plentiful, but of low calorific value, low sulfur, and can be, and can prospectively

be hydrogenated to manuf. liq. motor fuel with new technol.

IT **12027-67-7,** Ammonium paramolybdate
(hydrogenation of coals from the Yerkovetsk field to obtain liq. fuel)

RN 12027-67-7 HCA

CN Molybdate (Mo7O24 6-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

IT **7704-34-9,** Sulfur, uses
(hydrogenation of coals from the Yerkovetsk field to obtain liq. fuel)

RN 7704-34-9 HCA

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

IT **7783-06-4, Hydrogen sulfide,** formation (nonpreparative)
(hydrogenation of coals from the Yerkovetsk field to obtain liq. fuel)

RN 7783-06-4 HCA

CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

CC 51-21 (Fossil Fuels, Derivatives, and Related Products)
IT **12027-67-7**, Ammonium paramolybdate
(hydrogenation of coals from the Yerkovetsk field to obtain liq. fuel)
IT **7704-34-9**, Sulfur, uses 9005-53-2, Lignin, uses
(hydrogenation of coals from the Yerkovetsk field to obtain liq. fuel)
IT 124-38-9, Carbon dioxide, formation (nonpreparative) 630-08-0, Carbon monoxide, formation (nonpreparative) **7783-06-4**, **Hydrogen sulfide**, formation (nonpreparative)
(hydrogenation of coals from the Yerkovetsk field to obtain liq. fuel)

L26 ANSWER 3 OF 16 HCA COPYRIGHT 2004 ACS on STN
138:92256 Catalyst for oxidizing **hydrogen sulfide** gas and method for recovering **elemental sulfur** using the same. Chung, Jong Shik; Shin, Moon Young (Envichem Co., Ltd., S. Korea; Pohang University of Science & Technology). U.S. US 6506356 B1 20030114, 10 pp. (English). CODEN: USXXAM. APPLICATION: US 2000-685302 20001010. PRIORITY: KR 1999-43783 19991011.
AB A catalyst for recovering **elemental sulfur** by the selective oxidn. of **hydrogen sulfide** is represented by the following chem. formula: VaTibXcOf wherein, a is such a mole no. that vanadium amts. to 5-40% by wt. based on the total wt. of the catalyst; b is such a mole no. that titanium amts. to 5-40% by wt. based on the total wt. of the catalyst; X is an element selected from the group consisting of Fe, Mn, Co, Ni, Sb and Bi; c is such a mole no. that X amts. to 15% by wt. or less based on the total wt. of the catalyst; and f is such a mole no. that oxygen is contained to the final 100% by wt. The catalyst can recover **elemental sulfur** at high rates for a long period of time without being deteriorated in activity. The high catalytic activity is maintained even when excess water is present in the reaction gas.
IT **7704-34-9P**, Sulfur, preparation
(catalyst for oxidizing **hydrogen sulfide** gas and method for recovering **elemental sulfur** using the same)
RN 7704-34-9 HCA
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

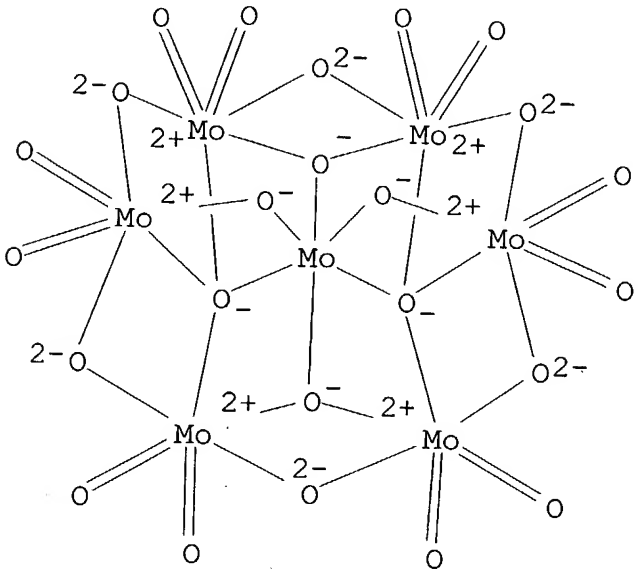
S

IT **7783-06-4, Hydrogen sulfide,** reactions
12027-67-7, Ammonium molybdate
(catalyst for oxidizing **hydrogen sulfide** gas and method for recovering **elemental sulfur** using the same)

RN 7783-06-4 HCA
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

IC ICM C01B017-02
NCL 423573100; 423576800; 502303000; 502304000; 502305000; 502324000; 502325000; 502340000; 502349000; 502350000
CC 49-1 (Industrial Inorganic Chemicals)
ST oxidn catalyst **hydrogen sulfide** **elemental sulfur** manuf
IT Oxidation catalysts
(catalyst for oxidizing **hydrogen sulfide** gas and method for recovering **elemental sulfur**

using the same)

IT 7439-89-6, Iron, uses 7439-91-0, Lanthanum, uses 7439-95-4, Magnesium, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-24-6, Strontium, uses 7440-31-5, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses 7440-45-1, Cerium, uses 7440-46-2, Cesium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses 7440-69-9, Bismuth, uses 7440-70-2, Calcium, uses 7631-86-9, Silica, uses 138161-54-3, Iron titanium vanadium oxide 485385-60-2, Iron molybdenum titanium vanadium oxide 485385-61-3
(catalyst for oxidizing **hydrogen sulfide** gas and method for recovering **elemental sulfur** using the same)

IT **7704-34-9P**, Sulfur, preparation
(catalyst for oxidizing **hydrogen sulfide** gas and method for recovering **elemental sulfur** using the same)

IT 144-62-7, Oxalic acid, reactions 3087-37-4 7646-78-8, Tin chloride (SnCl4), reactions 7697-37-2, Nitric acid, reactions 7773-01-5, Manganese chloride (MnCl2) 7779-88-6, Zinc nitrate **7783-06-4, Hydrogen sulfide**, reactions 7803-55-6, Ammonium vanadate (NH4VO3) 10025-91-9, Antimony chloride (SbCl3) 10361-44-1, Bismuth nitrate 10421-48-4, Iron nitrate (Fe(NO3)3) **12027-67-7, Ammonium molybdate** 13548-38-4, Chromium nitrate (Cr(NO3)3) 13693-11-3, Titanium sulfate (Ti(SO4)2) 27774-13-6, Vanadium oxide sulfate (VO(SO4)) 224645-75-4, Ammonium tungstate ((NH4)6W12O39)
(catalyst for oxidizing **hydrogen sulfide** gas and method for recovering **elemental sulfur** using the same)

L26 ANSWER 4 OF 16 HCA COPYRIGHT 2004 ACS on STN

129:97437 Analysis of organic sulfur via catalytic hydrodesulfurization. Summan, Abdel-Hadi. M. (Chemistry Department, Faculty of Applied Science, Makkah Al-Mukarramah, Saudi Arabia). Analytical Letters, 31(9), 1623-1630 (English) 1998. CODEN: ANALBP. ISSN: 0003-2719. Publisher: Marcel Dekker, Inc..

AB Three types of hydrodesulfurization (HDS) catalysts, namely; Co-Mo/Al2O3, Ni-Mo/Al2O3 and Ni-W/Al2O3 with various contents of group VI (Mo and W) and group VIII (Co and Ni) oxides, but with a fixed ratio of 4:1, resp., were prepd. via impregnating .gamma.-Al2O3 pellets with solns. contg. cobalt or nickel nitrate and **ammonium molybdate** or tungstate. After drying and calcination, the catalysts were then sulfided in situ in the reactor. Two refractory sulfur compds., namely; benzothiophene and dibenzothiophene, were tested for a complete HDS on the prepd.

catalysts. Some catalyst prepns. reached quant. transformation of the thiophenic compds. under study to **H2S** at a temp. of 450.degree.C in a H2 flow of 20 cm3 min-1.

IT **7704-34-9**, Sulfur, analysis
(anal. of org. sulfur via catalytic hydrodesulfurization)

RN 7704-34-9 HCA

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

CC 51-3 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67, 79

IT **7704-34-9**, Sulfur, analysis
(anal. of org. sulfur via catalytic hydrodesulfurization)

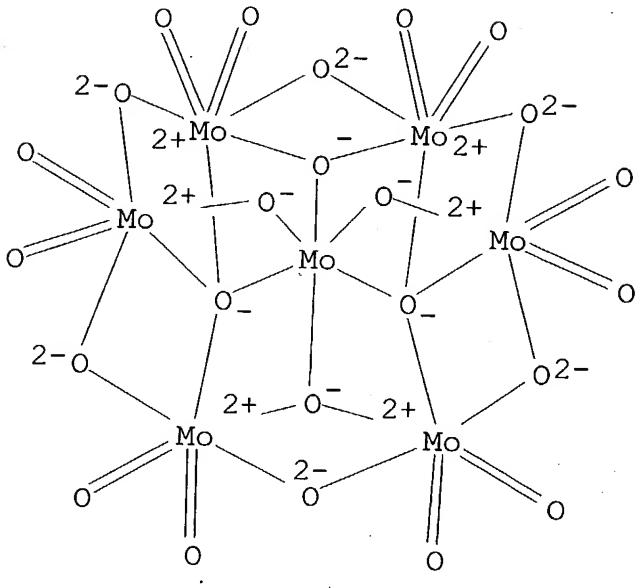
L26 ANSWER 5 OF 16 HCA COPYRIGHT 2004 ACS on STN

127:295907 Comparison of dry and solvent-mediated liquefaction of high-sulfur Turkish coals. Artok, L.; Gozmen, B.; Avci, A.; Erbatur, N. G.; Erbatur, O. (Department Chemistry, Cukurova University, Adana, 01330, Turk.). DGMK Tagungsbericht, 9704(Proceedings ICCS '97, Volume 3), 1493-1496 (English) 1997. CODEN: DGTAF7. ISSN: 1433-9013. Publisher: Deutsche Wissenschaftliche Gesellschaft fuer Erdoel, Erdgas und Kohle.

AB Two high-S Turkish coals (Gediz 11.1% daf; Cayirhan 7.5% daf) were liquefied via catalytic and noncatalytic reactions in microautoclave tubing bombs at 300-450.degree., under 1000 psi H2 for 30 min., in the presence and absence of the H-donor solvent tetralin. (NH4)6Mo7O24 was utilized as the catalyst precursor in the catalytic runs. In terms of total conversion to THF-solubles and oil and gas formation, optimum conditions were found to be 450.degree. in the presence of tetralin. Indeed, the presence of tetralin promoted higher total conversions and oil formation at all temps. However, both coals demonstrated their highest overall conversion at 400.degree. in the absence of solvent; 90% for Gediz coal and 75% for Cayirhan, although the product slate shined to higher mol.-wt. products in this case. Conversion of S to **H2S** increased with temp.; approx. half the S content of both coals converted to **H2S** at 450.degree.. However tetralin was found to retard **H2S** formation; the amt. of **H2S** formed was ca 1/3-1/2 of that without solvent. Primary S structures detd. in the oil fraction were dibenzothiophene and various alkyl-substituted benzothiophenes. Catalyst was slightly effective in removing S in the absence of solvent, but only a negligible effect was obsd. in the presence of tetralin.

IT **12027-67-7**, Ammonium heptamolybdate
(catalyst precursor; comparison of dry and solvent-mediated catalytic and noncatalytic liquefaction of high-S Turkish coals)

RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

IT **7704-34-9,** Sulfur, analysis
(content in products after dry and solvent-mediated catalytic and noncatalytic liquefaction of high-S Turkish coals)
RN 7704-34-9 HCA
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

CC 51-21 (Fossil Fuels, Derivatives, and Related Products)
IT **12027-67-7,** Ammonium heptamolybdate
(catalyst precursor; comparison of dry and solvent-mediated catalytic and noncatalytic liquefaction of high-S Turkish coals)
IT **7704-34-9,** Sulfur, analysis
(content in products after dry and solvent-mediated catalytic and noncatalytic liquefaction of high-S Turkish coals)

L26 ANSWER 6 OF 16 HCA COPYRIGHT 2004 ACS on STN
120:275194 Fuel composition for two-cycle engines. Callis, Glenn E.; Sabourin, Edward T. (Chevron Research and Technology Co., USA). PCT Int. Appl. WO 9406897 A1 19940331, 34 pp. DESIGNATED STATES: W:

AU, CA, JP; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1993-US8471 19930909. PRIORITY: US 1992-943844 19920911.

AB A fuel compn. for two-cycle engines comprising a major amt. of fuel boiling in the gasoline range and a minor amt. of a lubricant compn. comprising a base oil of lubricating viscosity and an additive formulation comprising (1) a molybdenum/sulfur complex of a basic nitrogen compd., (2) a carboxylic acid amide, and (3) a succinimide.

IT **7704-34-9D**, Sulfur, molybdenum salt complexes with
7783-06-4D, **Hydrogen sulfide**, molybdenum
salt complexes with
(gasoline additives contg.)

RN 7704-34-9 HCA

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

RN 7783-06-4 HCA

CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

IC ICM C10M159-18
ICS C10M133-16; C10M149-00

CC 51-7 (Fossil Fuels, Derivatives, and Related Products)

IT 62-55-5D, Thioacetamide, molybdenum salt complexes with 62-56-6D, Thiourea, molybdenum salt complexes with 1314-80-3D, Phosphorus pentasulfide, molybdenum salt complexes with 7439-98-7D, Molybdenum, basic nitrogen compd. salts, sulfur complexes with **7704-34-9D**, Sulfur, molybdenum salt complexes with 7782-91-4D, Molybdic acid, sulfur compd. complexes with **7783-06-4D**, **Hydrogen sulfide**, molybdenum salt complexes with 11098-84-3D, **Ammonium molybdate**, sulfur compd. complexes with
(gasoline additives contg.)

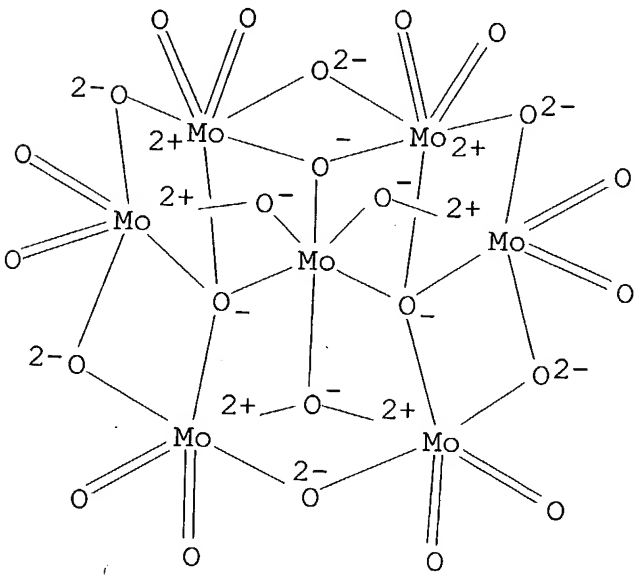
L26 ANSWER 7 OF 16 HCA COPYRIGHT 2004 ACS on STN

118:106141 Catalysts for removal of sulfur-containing compounds from fuel gases such as natural gas and their manufacture and use. Immel, Otto; Mueller, Harald (Bayer A.-G., Germany). Ger. Offen. DE 4104202 A1 19920813, 7 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1991-4104202 19910212.

AB Thiols, COS, CS2, and other org. S-contg. compds. are removed from fuel gases such as natural gas by catalytic conversion with catalysts comprising an inorg., refractory monolithic honeycomb support loaded with .gtoreq.1 oxides of Group I, II, VI, and VIII

elements. Suitable supports include alumina, spinel, zeolites, and mica. Suitable catalysts contain .gtoreq.1 oxides of Cu, Zn, Cr, Mo, W, Fe, Co, and Ni.

IT **12027-67-7**
(catalyst, for sweetening of natural gas)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

IT **7704-34-9D**, Sulfur, org. compds. **7783-06-4D**, **Hydrogen sulfide (H2S)**, **Hydrogen sulfide**, miscellaneous
(removal of, from natural gas, catalyst for)
RN 7704-34-9 HCA
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

RN 7783-06-4 HCA
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

IC ICM B01J023-85
ICS B01J023-88; B01J023-94; B01D053-36; C01B031-20; C01B021-04; C10K001-34
ICA B01J021-04; B01J029-04; C10L003-00
CC 51-5 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 49, 59
IT 1313-99-1, Nickel oxide, uses 1314-13-2, Zinc oxide, uses 1314-35-8, Tungsten oxide, uses 1332-37-2, Iron oxide, uses 1344-70-3, Copper oxide 7789-09-5 11098-99-0, Molybdenum oxide 11104-61-3, Cobalt oxide 11118-57-3, Chromium oxide **12027-67-7** 15855-70-6, Ammonium tungstate
(catalyst, for sweetening of natural gas)
IT 75-15-0, Carbon disulfide, miscellaneous 463-58-1, Carbonyl sulfide **7704-34-9D**, Sulfur, org. compds. **7783-06-4D, Hydrogen sulfide** (**H2S**), **Hydrogen sulfide**, miscellaneous
(removal of, from natural gas, catalyst for)

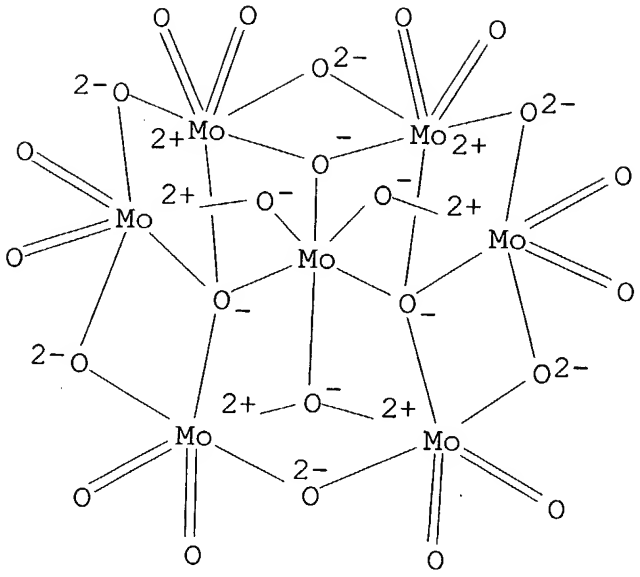
L26 ANSWER 8 OF 16 HCA COPYRIGHT 2004 ACS on STN
105:131353 Interactions between copper, molybdenum and sulfur in the rumen of sheep. Gawthorne, J. M.; Allen, J. D.; Nader, C. J. (Sch. Vet. Stud., Murdoch Univ., Murdoch, 6150, Australia). Trace Elem. Man Anim. -- TEMA 5, Proc. Int. Symp., 5th, Meeting Date 1984, 346-51. Editor(s): Mills, C. F.; Bremner, I.; Chesters, J. K. CAB: Farnham Royal, Slough, UK. (English) 1985. CODEN: 55DSAX.
AB Expts. were conducted to help explain the interference by Mo and S with Cu availability and the kinetics of S metab. in the rumen of sheep. Addn. of molybdate to the rumen prior to the addn. of Na2S soln. significantly decreased S2- absorption by the rumen, while at the same time trithiomolybdate (TTM) was readily detd. In in vitro expts., addn. of TTM had no effect on the distribution of Zn and Fe, but increased the proportion of Cu and Mo in the strained solids fraction of the rumen digesta at the expense of the bacterial and supernatant fractions. In in vitro studies of the effects of Mo and S compd. on acid soly. of Cu in sheep rumen contents it was found that TTM and **ammonium molybdate** (AM) decreased Cu soly., whereas S2- itself was without effect. In in vivo expts., TTM and AM at dietary concns. equiv. to 5 ppm Mo or 25 ppm Mo approx. halved the proportions of Cu in the bacterial and supernatant fractions. More significantly, the compds. reduced the proportion of acid-sol. Cu in all fractions. It is hypothesized that inorg, Mo compds., are converted to thiomolybdates in the rumen in the presence of S2-. These compds., in turn, react to form complexes that bind Cu and reduce its soly. and decrease **H2S** concn. and thus the rate of S2- absorption.
IT **7704-34-9**, biological studies
(copper and molybdenum interaction with, in sheep rumen)
RN 7704-34-9 HCA

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

CC 13-6 (Mammalian Biochemistry)
IT **7704-34-9**, biological studies
(copper and molybdenum interaction with, in sheep rumen)

L26 ANSWER 9 OF 16 HCA COPYRIGHT 2004 ACS on STN
105:63474 Coal hydrogenation in the presence of an emulsified catalyst and a recycle paste-forming agent. Zekel, L. A.; Krichko, A. A.; Shpirt, M. Ya.; Yulin, M. K.; Pchelina, D. P.; Krasnobaeva, N. V. (Inst. Goryuch. Iskop., Moscow, USSR). Khimiya Tverdogo Topliva (Moscow, Russian Federation) (3), 73-6 (Russian) 1986. CODEN: KTVTBY. ISSN: 0023-1177.
AB The consumption of Mo in the hydroliquefaction of coal catalyzed by an ammonium paramolybdate (I) suspension is lowered when powd. S is added. In a continuous process when a paste contg. I, S, coal, water , and petroleum distn. residues b. >280.degree. or coal liq. b. 300-400.degree., the fine particles of MoS2 accumulate on the recycle paste. These MoS2 particles have practically the same catalytic effect as I. Powd S that has not reacted with I is converted to **H2S** as is also most of the coal S.
IT **12027-67-7**
(catalysts, for coal hydroliquefaction, sulfur effect on)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

IT **7704-34-9**, reactions
(reactions of, with ammonium paramolybdate catalysts, in coal hydroliquefaction)
RN 7704-34-9 HCA
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

CC 51-21 (Fossil Fuels, Derivatives, and Related Products)
IT **12027-67-7**
(catalysts, for coal hydroliquefaction, sulfur effect on)
IT **7704-34-9**, reactions
(reactions of, with ammonium paramolybdate catalysts, in coal hydroliquefaction)

L26 ANSWER 10 OF 16 HCA COPYRIGHT 2004 ACS on STN
103:205053 Spectrophotometric determination of sulfur after reduction to **hydrogen sulfide** in beryllium-containing minerals.
Bogdanova, V. I.; Koz'menko, O. A.; Gorchakova, L. A. (USSR).
Fiz.-Khim. Issled. Sul'fidnykh Silik. Sist., 155-66. Editor(s): Kolonin, G. R. Akad. Nauk SSSR, Sib. Otd., Inst. Geol. Geofiz.: Novosibirsk, USSR. (Russian) 1984. CODEN: 54KEAJ.

AB S was detd. in small samples of Be-contg. silicate minerals by methods involving redn. to **H2S**, reaction with **ammonium molybdate**, and measuring the absorbance of molybdenum blue.

IT **7704-34-9**, analysis
(detn. of, in beryllium-contg. minerals, spectrophotometric)

RN 7704-34-9 HCA

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

CC 79-6 (Inorganic Analytical Chemistry)

IT **7704-34-9**, analysis
(detn. of, in beryllium-contg. minerals, spectrophotometric)

L26 ANSWER 11 OF 16 HCA COPYRIGHT 2004 ACS on STN

102:48376 Multifunctional additive based on diethylenetriamine alkenylsuccinimide. Evstaf'ev, V. P.; Shor, G. I.; Ivanova, E. A.; Melamed, S. O. (VNII NP, USSR). Khimiya i Tekhnologiya Topliv i Masel (10), 25-8 (Russian) 1984. CODEN: KTPMAG. ISSN: 0023-1169.

AB A series of multifunctional (antiwear-antioxidants) lubricating oil additives were prepd. by chem. modifying S 5A (com. additive, alkenyl-2-[[(2-aminoethyl)amino]ethyl]succinimide). Thus, Tomol 8 and Tomol A were prepd. from S 5A and compds. of S and P; Tomol D was the product of **H2S** with S 5A; Tomol V V was prepd. from org. S compds. and S 5A; Tomol S was prepd. from S and S 5A; SDMO was prepd. by a reaction of **ammonium molybdate** and S 5A.

IT **7704-34-9D**, reaction products with alkenyl-2-[[(2-aminoethyl)amino]ethyl]succinimide **7783-06-4D**, reaction products with alkenyl-2-[[(2-aminoethyl)amino]ethyl]succinimide
(lubricating oil anticorrosion-antiwear additives)

RN 7704-34-9 HCA

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

RN 7783-06-4 HCA

CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

CC 51-8 (Fossil Fuels, Derivatives, and Related Products)

IT 122-11-2 **7704-34-9D**, reaction products with alkenyl-2-[[(2-aminoethyl)amino]ethyl]succinimide **7783-06-4D**

, reaction products with alkenyl-2-[[(2-aminoethyl)amino]ethyl]succinimide 11098-84-3D, reaction products with alkenyl-2-[[(2-aminoethyl)amino]ethyl]succinimide 55644-48-9D, derivs. 59890-40-3D, derivs. 87917-08-6 94035-40-2 94189-45-4 94189-46-5 94189-47-6 94189-48-7
(lubricating oil anticorrosion-antiwear additives)

L26 ANSWER 12 OF 16 HCA COPYRIGHT 2004 ACS on STN
85:182910 Hydrodesulfurization catalyst. (American Cyanamid Co., USA; American Cyanamid Co.). Neth. Appl. NL 7510059 19760326, 13 pp. (Dutch). CODEN: NAXXAN. APPLICATION: NL 1975-10059 19750826.

AB A hydrodesulfurization catalyst, to remove high concns. of S from foreign oils, is prepd. Thus, 270 g calcined .gamma.-Al2O3 cylinders of 0.16 cm diam. and 0.8 cm3/g vol. are impregnated with 200 ml H2O contg. 56.25 g (NH4)2Mo2O7 and 22 ml concd. NH4OH. After drying for 30 min. at room temp. and 3 hr at 130.degree., it is calcined for 1 hr at 650.degree.. The material is then treated for 2 hr at 400.degree. with a gas mixt. contg. 10% **H2S** and 90% H2 to convert all MoO3 to MoS2. Part of the catalyst is then treated with a soln. of Co(SCN)2 in CH3CN, dried for 20 min at room temp., and dried 5 hr at 135.degree. under 0.5-1 mm pressure. This modified catalyst contains the equiv. of 3% CoO and 15% MoO and after presulfurizing had a relative S activity of 180 vs. 100 for catalyst not sulfided before addn. of Co.

IT **27546-07-2**
(catalyst manuf. from, for hydrodesulfurization of petroleum)

RN 27546-07-2 HCA

CN Ammonium molybdenum oxide ((NH4)2Mo2O7) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	7	17778-80-2
H4N	2	14798-03-9
Mo	2	7439-98-7

IT **7704-34-9**, uses and miscellaneous
(removal of, from petroleum, catalysts for)

RN 7704-34-9 HCA

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

IC B01J037-20

CC 67-1 (Catalysis and Reaction Kinetics)
Section cross-reference(s): 51

IT 71-48-7 3017-60-5 **27546-07-2**

(catalyst manuf. from, for hydrodesulfurization of petroleum)
IT **7704-34-9**, uses and miscellaneous
(removal of, from petroleum, catalysts for)

L26 ANSWER 13 OF 16 HCA COPYRIGHT 2004 ACS on STN
83:38342 Sulfide measurement using **ammonium molybdate**. Darcel, F. C.; Ali, M. S. (Sediment Biomater. Lab., Minist. Environ., Toronto, ON, Can.). Proc. Int. Conf. Transp. Persistent Chem. Aquat. Ecosyst., II, 7-12. Natl. Res. Counc. Can: Ottawa, Can. (English) 1974. CODEN: 30IAAH.
AB A technique utilizing **ammonium molybdate** [11098-84-3] in a microabsorber system able to analyze 0.5-1000 .mu.g sulfide [**18496-25-8**] as **H2S** [**7783-06-4**] in natural waters and industrial wastes, showed detection limits of 0.02 ppm, and 0.002 ppm after increasing aliquot sizes. **H2S** evolved from thioacetamide [62-55-5] was detected at .gtoreq. 0.2 ppm.
IT **7783-06-4**, analysis **18496-25-8**
(detn. of, in water, by **ammonium molybdate**)
RN 7783-06-4 HCA
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

RN 18496-25-8 HCA
CN Sulfide (8CI, 9CI) (CA INDEX NAME)

S^{2-}

CC 4-1 (Toxicology)
Section cross-reference(s): 60
ST sulfide detn **ammonium molybdate**; waste water sulfide detn
IT Waste water
(sulfide detn. in, by **ammonium molybdate**)
IT 62-55-5
(detn. of, by **ammonium molybdate**)
IT **7783-06-4**, analysis **18496-25-8**
(detn. of, in water, by **ammonium molybdate**)
IT 7732-18-5, analysis
(sulfide detn. in, by **ammonium molybdate**)

L26 ANSWER 14 OF 16 HCA COPYRIGHT 2004 ACS on STN
65:107083 Original Reference No. 65:19906b-d Drilling mud additive. Annis, Max R. (Esso Production Research Co.). US 3275551 19660927, 8 pp. (Unavailable). APPLICATION: US 19621227.

AB Drilling mud additive having properties which inhibit the sticking of drill pipe and collars is described. The additive is a Mo complex prepd. by dispersing an ext. of a Mo compd. in an oil soln. of a surface-active material and converting a portion of the Mo compd. to the sulfide. For example, the Mo complexes are prepd. as follows. (NH4)2-MoO4 (1 part by wt.) is mixed with 6 parts of 6N HCl. The soln. is cooled to 50-80.degree.F. and extd. with, e.g., 21.5 parts Et2O or 10 parts MeCOEt. Sepn. into 2 layers is permitted and the ext. layer is removed and stirred into 5 to 8 parts by wt. of a surfactant. The dispersion is then treated with **H2S** (S/Mo 1:1). The dispersion is heated and stripped with an inert gas, e.g., N, to remove solvent H2O, and excess **H2S** and the product is filtered. The additive was field tested in a well while drilling from approx. 12,500 to 13,500 ft. Additive (25 gal.) was added to a mud composed of a 12.6 lb./gal. gyp-Q-Broxin mud contg. 8% kerosine and 24% solids, and having a funnel viscosity of 50 sec. and an API filtration of 5.2 ml. The sticking coeff. (measure of how strongly pipe becomes stuck and is the tangential force required to move a plate over the mud filter cake divided by the force normal to the plate) showed a decrease of 10% in the 60-min. set time value.

IT **7704-34-9,** Sulfur
(compounds, phosphorus-contg., as dispersants for, Mo sulfide drilling fluid additive)

RN 7704-34-9 HCA

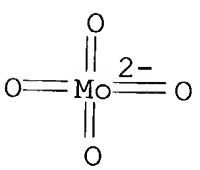
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

IT **13106-76-8, Ammonium molybdate**(VI), (NH4)2MoO4
(drilling fluid additive from HCl- and **H2S**-treated)

RN 13106-76-8 HCA

CN Molybdate (MoO42-), diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

IT **7783-06-4, Hydrogen sulfide (H2S)**
(drilling fluid additives from Mo compds. treated with)
RN 7783-06-4 HCA
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

NCL 252008500
CC 27 (Petroleum and Petroleum Derivatives)
IT Drilling fluids or Drilling muds
(molybdenum compds. (**H2S**-treated) for)
IT 7647-01-0, Hydrochloric acid
(**ammonium molybdate** treated with, as drilling fluid additive)
IT 7439-98-7, Molybdenum
(compds., drilling fluid additives from **H2S**-treated)
IT **7704-34-9**, Sulfur
(compounds, phosphorus-contg., as dispersants for, Mo sulfide drilling fluid additive)
IT **13106-76-8, Ammonium molybdate**(VI), (NH4)2MoO4
(drilling fluid additive from HCl- and **H2S**-treated)
IT 7782-91-4, Molybdic(VI) acid
(drilling fluid additive from **H2S**-treated)
IT 11116-47-5, Molybdate(VI)
(drilling fluid additives from **H2S**-treated)
IT **7783-06-4, Hydrogen sulfide (H2S)**
(drilling fluid additives from Mo compds. treated with)

L26 ANSWER 15 OF 16 HCA COPYRIGHT 2004 ACS on STN
51:24835 Original Reference No. 51:4876b-d Influence of arsenic on the analysis of iron and steel. I. Determination of sulfur and phosphorus in iron and steel. Goto, Hidehiro; Watanabe, Shiro Sci. Repts. Research Insts., Tohoku Univ., Ser. A, 8, 157-65 (Unavailable) 1956.
AB The effects of As on the detns. of S and P in iron and steel were studied and a method for avoiding the interference of As is described. S in iron and steel was detd. volumetrically by ignition to SO2 and SO3, by solution in nonoxidative strong acids to form **H2S** which is then detd. volumetrically by I2, and gravimetrically by pptn. as BaSO4. In each of these 3 methods the presence of As has no effect on the accuracy of the S detn. It is suggested that an efficient absorbing bottle of KMnO4 soln. be used in the 2nd method to reduce the health hazard from AsH3. P is detd. by standard methods by alkalimetric titration after **ammonium**

molybdate pptn. Arsenic interferes by forming a yellow ppt. of ammonium arsenomolybdate and is usually removed as a sulfide or bromide. The authors present data which show that the effect of As on P can be removed by pptn. at lower temps. (30-40.degree.).

IT **7704-34-9**, Sulfur
(analysis, detn. in Fe and steel, As effect on)
RN 7704-34-9 HCA
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

CC 7 (Analytical Chemistry)
IT **7704-34-9**, Sulfur 7723-14-0, Phosphorus
(analysis, detn. in Fe and steel, As effect on)

L26 ANSWER 16 OF 16 HCA COPYRIGHT 2004 ACS on STN
36:23836 Original Reference No. 36:3655c-d A rapid method for the determination of sulfur in fuels by reduction. Mantel, W.; Schreiber, W. Archiv fuer Waermewirtschaft und Dampfkesselwesen, 21, 65-7 From: Chem. Zentr. 1940, I, 3213 (Unavailable) 1940. CODEN: AWDKAV. ISSN: 0365-8422.

AB cf. C. A. 34, 4540.6, 7571.8; 35, 7684.5. Coals were gasified in the presence of a catalyst consisting of a mixt. of CaC_2O_4, $Ca(OH)_2$ and **ammonium molybdate**. For coke and low-temp. coke Li_2CO_3 had to be added also to this mixt. All of the S was evolved as **H2S**, which was pptd. in the usual manner as CdS and detd. indometrically. Comparative results obtained on 34 samples are reported.

IT **7704-34-9**, Sulfur
(analysis, detn. in fuels)
RN 7704-34-9 HCA
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

CC 21 (Fuels and Carbonization Products)
IT **7704-34-9**, Sulfur
(analysis, detn. in fuels)

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L27 ANSWER 1 OF 20 HCA COPYRIGHT 2004 ACS on STN
141:252910 Synthesis, Characterization, and X-Ray Diffraction Analysis of Triethylenetetraammonium Tetrathiomolybdate. Pokhrel, S.; Nagaraja, K. S.; Varghese, B. (Loel Institute of Energy, Chemistry

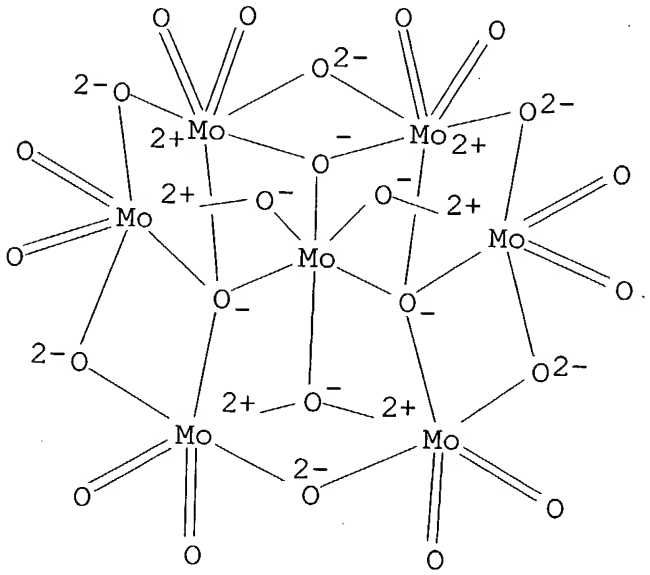
Department, Loel College, Chenai, India). Journal of Structural Chemistry (Translation of Zhurnal Strukturnoi Khimii), 44(4), 689-694 (English) 2003. CODEN: JSTCAM. ISSN: 0022-4766. Publisher: Kluwer Academic/Consultants Bureau.

AB The reaction of gaseous **H2S** with aq. ammonium heptamolybdate in the presence of triethylenetetramine (trien) gave a red complex. The complex was recrystd. in hot H2O and characterized by element anal. and UV, visible, IR, and 1H NMR spectroscopy. PMR revealed accidental magnetic equivalence, resulting from the proximity of [MoS4]2- species in one complex mol. to the open triethylenetetramine ligand of another mol. (TrienH2)[MoS4] crystallizes in the orthorhombic crystal system, space group Pca21, a 13.045(2), b 16.461(3), c 13.754(2) .ANG., .alpha. 90, .beta. 90, .gamma. 90.degree., Z = 8, R1 = 0.0323, wR2 = 0.0730. The structure consists of the tetrahedral tetrathiomolybdate anions, forming an extended 3-dimensional framework in solids due to the interactions with triene cations via Mo-S...H-N H bonds.

IT **12027-67-7**, Ammonium heptamolybdate
(for prepn. of triethylenetetraammonium tetrathiomolybdate)

RN 12027-67-7 HCA

CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



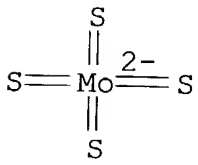
●6 NH_4^+

IT **749859-39-0P**

(prepn. and crystal structure of)
RN 749859-39-0 HCA
CN INDEX NAME NOT YET ASSIGNED

CM 1

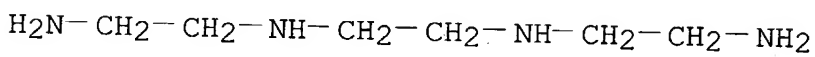
CRN 13818-85-4
CMF H . 1/2 Mo S4
CCI CCS



●2 H^+

CM 2

CRN 112-24-3
CMF C6 H18 N4



CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75
IT 112-24-3, Triethylenetetramine **12027-67-7**, Ammonium heptamolybdate
(for prepn. of triethylenetetraammonium tetrathiomolybdate)
IT **749859-39-0P**
(prepn. and crystal structure of)

L27 ANSWER 2 OF 20 HCA COPYRIGHT 2004 ACS on STN
140:227820 Preparation, characterization, and x-ray structure analysis of diethylenetriammonium tetrathiomolybdate. Pokhrel, Suman; Nagaraja, K. S.; Varghese, Babu (Department of Chemistry, Loyola Institute of Frontier Energy, Loyola College, Chennai, 600 034, India). Journal of Chemical Crystallography, 33(11), 903-908 (English) 2003. CODEN: JCCYEV. ISSN: 1074-1542. Publisher: Kluwer Academic/Plenum Publishers.
AB The interaction of **H2S** gas with aq. ammonium heptamolybdate soln. in the presence of diethylenetriamine (dien)

gave diethylenetriammonium tetrathiomolybdate crystals. The elemental analyses, UV-Visible, IR, and 1H NMR spectra suggested org. cation and (MoS4)2- moiety. The 1H NMR revealed two sets of sym. A2X2 multiple patterns. The compd. crystallizes in monoclinic space group Pn, a 7.196(6), b 7.532(3), c 11.525(10) .ANG., .beta. 90.17(3), and Z = 2, Rw1 = 0.0261 and Rw2 = 0.0698. The structure consists of tetrahedral tetrathiomolybdate anions, which form an extended three-dimensional network in the solid state with Mo-S.cntdot..cntdot..cntdot.H-N H bonding with the org. cation.

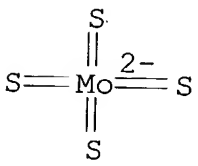
IT **663949-90-4P**
(prepn. and crystal structure of)

RN 663949-90-4 HCA

CN Molybdate(2-), tetrathioxo-, (T-4)-, dihydrogen, compd. with N-(2-aminoethyl)-1,2-ethanediamine (1:1) (9CI) (CA INDEX NAME)

CM 1

CRN 13818-85-4
CMF H . 1/2 Mo S4
CCI CCS



● 2 H^+

CM 2

CRN 111-40-0
CMF C4 H13 N3

$H_2N-CH_2-CH_2-NH-CH_2-CH_2-NH_2$

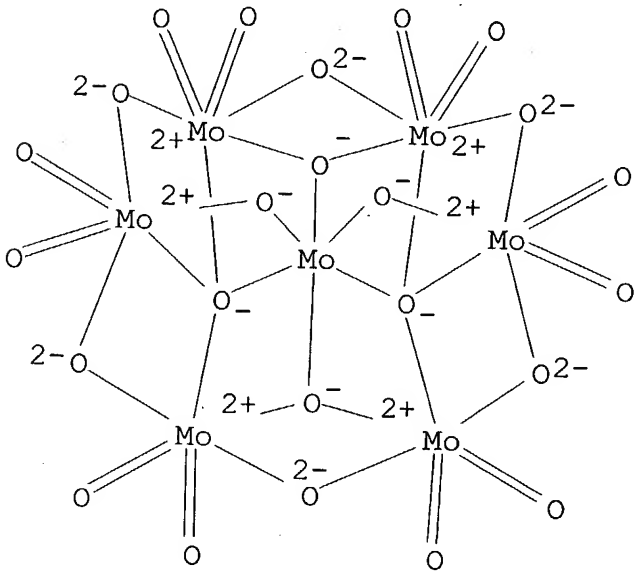
IT **7783-06-4, Hydrogen sulfide,** reactions
(reaction with ammonium heptamolybdate and diethylenetriamine)

RN 7783-06-4 HCA

CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

IT **12027-67-7**, Ammonium heptamolybdate
(reaction with **hydrogen sulfide** and diethylenetriamine)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75
IT **663949-90-4P**
(prepn. and crystal structure of)
IT **7783-06-4, Hydrogen sulfide**, reactions
(reaction with ammonium heptamolybdate and diethylenetriamine)
IT 111-40-0, Diethylenetriamine
(reaction with **hydrogen sulfide** and ammonium heptamolybdate)
IT **12027-67-7**, Ammonium heptamolybdate
(reaction with **hydrogen sulfide** and diethylenetriamine)

L27 ANSWER 3 OF 20 HCA COPYRIGHT 2004 ACS on STN
135:326548 Two Cation Disulfide Layers in the WxMo(1-x)S2 Lamellar Solid Solution. Thomazeau, Cecile; Geantet, Christophe; Lacroix, Michel; Harle, Virginie; Benazeth, Simone; Marhic, Christiane; Danot, Michel

(Institut de Recherches sur la Catalyse, UPR CNRS 5401, Villeurbanne, 69626, Fr.). Journal of Solid State Chemistry, 160(1), 147-155 (English) 2001. CODEN: JSSCBI. ISSN: 0022-4596. Publisher: Academic Press.

AB WxMo(1-x)S2 compds. with both Mo and W present in every disulfide layer, i.e., as an intralayer solid soln., can be obtained. Several synthesis routes were used but all of them do not allow this solid soln. and this evidences the decisive role of the nature of the precursor. In no case was formation of a WxMo(1-x)S2 solid soln. obsd. which resulted from stacking of homocationic [WS2] and [MoS2] layers (interlayer solid soln.). (c) 2001 Academic Press.

IT **7783-06-4, Hydrogen sulfide (H2S)**, reactions **12027-67-7**, Ammonium heptamolybdate (for prepn. of layered molybdenum tungsten disulfide solid solns.)

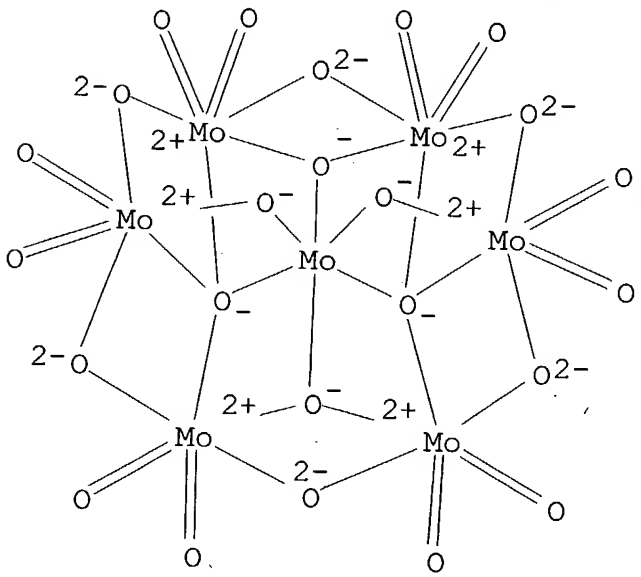
RN 7783-06-4 HCA

CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

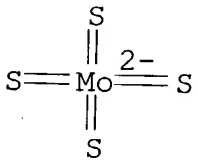
RN 12027-67-7 HCA

CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

IT **15060-55-6P**
(for prepn. of layered molybdenum tungsten disulfide solid solns.)
RN 15060-55-6 HCA
CN Molybdate(2-), tetrathioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

CC 78-6 (Inorganic Chemicals and Reactions)
IT **7783-06-4, Hydrogen sulfide (H2S)**, reactions **12027-67-7**, Ammonium heptamolybdate 12135-76-1, Ammonium sulfide 13862-78-7
(for prepn. of layered molybdenum tungsten disulfide solid solns.)
IT **15060-55-6P**
(for prepn. of layered molybdenum tungsten disulfide solid solns.)

L27 ANSWER 4 OF 20 HCA COPYRIGHT 2004 ACS on STN
135:204437 Synthesis and x-ray structure characterization of ethylenediammonium tetrathiomolybdate. Srinivasan, B. R.; Vernekar, Beena K.; Nagarajan, K. (Department of Chemistry, Goa University, Goa, 403 206, India). Indian Journal of Chemistry, Section A: Inorganic, Bio-inorganic, Physical, Theoretical & Analytical Chemistry, 40A(6), 563-567 (English) 2001. CODEN: ICACEC. ISSN: 0376-4710. OTHER SOURCES: CASREACT 135:204437. Publisher: National Institute of Science Communication, CSIR.
AB The passage of **hydrogen sulfide** gas into an aq. ammonium heptamolybdate soln. in the presence of ethylenediamine gives stable ethylenediammonium tetrathiomolybdate in good yields. The title compd. was characterized by IR, UV-visible and elemental anal. and its structure was detd. by single crystal x-ray crystallog. Ethylenediammonium tetrathiomolybdate crystallizes in the orthorhombic space group P212121 with the following unit cell dimensions for C2H10N2S4Mo (M = 286.3) a 8.582(5), b 9.276(5), c 11.792(5) .ANG., .alpha. = .beta. = .gamma. 90..degree., .nu. = 938.7(8) .ANG.3, Z = 4, dc = 2.026 g cm-3. The structure of the

title compd. consists of tetrahedral tetrathiomolybdate anions, which form an extended three dimensional network in the solid state, with the aid of N-H...S as well as C-H...S hydrogen bonding interactions with the org. cation.

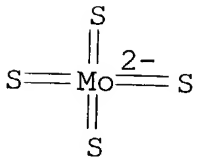
IT **60413-61-8P**, Ethylenediammonium tetrathiomolybdate
(prepn. and crystal and mol. structure)

RN 60413-61-8 HCA

CN Molybdate(2-), tetrathioxo-, (T-4)-, dihydrogen, compd. with 1,2-ethanediamine (1:1) (9CI) (CA INDEX NAME)

CM 1

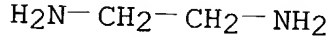
CRN 13818-85-4
CMF H . 1/2 Mo S4
CCI CCS



● 2 H^+

CM 2

CRN 107-15-3
CMF C2 H8 N2



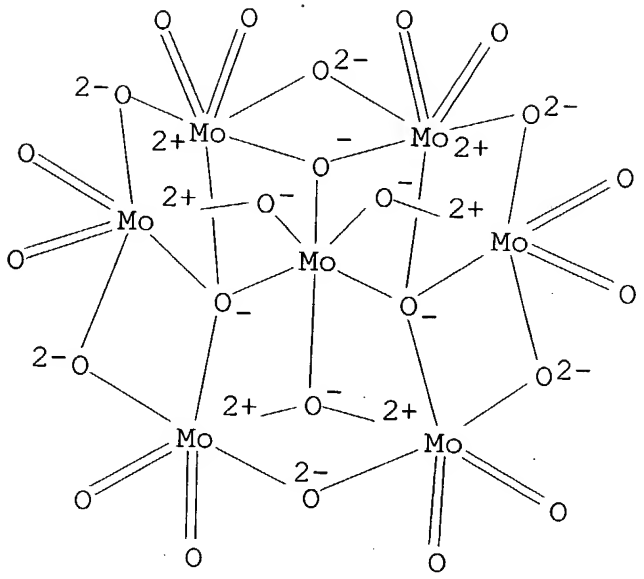
IT **7783-06-4, Hydrogen sulfide**, reactions
12027-67-7, Ammonium heptamolybdate
(reactant for prepn. of ethylenediammonium tetrathiomolybdate)

RN 7783-06-4 HCA

CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

RN 12027-67-7 HCA

CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



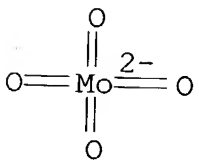
● 6 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75
IT **60413-61-8P**, Ethylenediammonium tetrathiomolybdate
(prepn. and crystal and mol. structure)
IT **7783-06-4, Hydrogen sulfide**, reactions
12027-67-7, Ammonium heptamolybdate
(reactant for prepn. of ethylenediammonium tetrathiomolybdate)

L27 ANSWER 5 OF 20 HCA COPYRIGHT 2004 ACS on STN
132:136942 One-pot conversion of alcohols to disulfides mediated by benzyltriethylammonium tetrathiomolybdate. Sinha, Surajit; Ilankumaran, P.; Chandrasekaran, S. (Department of Organic chemistry, Indian Institute of Science, Bangalore, 560 012, India). Tetrahedron, 55(51), 14769-14776 (English) 1999. CODEN: TETRAB. ISSN: 0040-4020. OTHER SOURCES: CASREACT 132:136942. Publisher: Elsevier Science Ltd..
AB The 1-pot conversion of alcs. to disulfides is reported with good yields via the activation of a HO group with DCC or P(NMe2)3/CCl4 followed by treatment with (PhCH2NMe3)2MOS4.
IT **7783-06-4, Hydrogen sulfide**, reactions
13106-76-8, Ammonium molybdate
(prepn. of benzylethylammonium thiomolybdate)
RN 7783-06-4 HCA
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

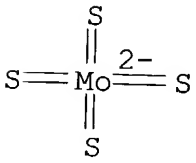
H_2S

RN 13106-76-8 HCA
CN Molybdate (MoO42-), diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

IT **15060-55-6P**
(prepn. of benzylethylammonium thiomolybdate)
RN 15060-55-6 HCA
CN Molybdate(2-), tetrathioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

IT **146785-42-4P**, Benzyltriethylammonium tetrathiomolybdate
(prepn. of disulfides by reaction of alcs. with benzylethylammonium thiomolybdate)
RN 146785-42-4 HCA
CN Benzenemethanaminium, N,N,N-triethyl-, (T-4)-tetrathioxomolybdate(2-) (2:1) (9CI) (CA INDEX NAME)

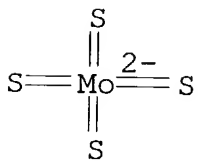
CM 1

CRN 16652-03-2
CMF C13 H22 N

$Et_3{}^{+}N-CH_2-Ph$

CM 2

CRN 16330-92-0
CMF Mo S4
CCI CCS



CC 21-2 (General Organic Chemistry)
Section cross-reference(s): 78
IT **7783-06-4, Hydrogen sulfide,** reactions
13106-76-8, Ammonium molybdate
(prepn. of benzylethylammonium thiomolybdate)
IT **15060-55-6P**
(prepn. of benzylethylammonium thiomolybdate)
IT 62965-15-5P **146785-42-4P,** Benzyltriethylammonium tetrathiomolybdate
(prepn. of disulfides by reaction of alcs. with benzylethylammonium thiomolybdate)

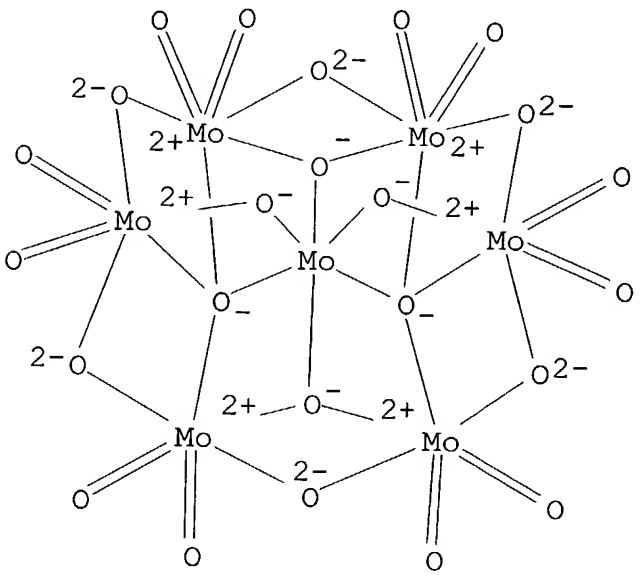
L27 ANSWER 6 OF 20 HCA COPYRIGHT 2004 ACS on STN
128:284373 Conversion of oxo and thiomolybdates to active dispersed catalysts. Zhan, Xiaodong; Dieterle, Mike; Lucas, Anthony; Van Woert, Howard; Givens, Edwin N. (Center Applied Energy Res., Univ. Kentucky, Lexington, KY, 40511-8410, USA). Preprints of Symposia - American Chemical Society, Division of Fuel Chemistry, 43(2), 320-324 (English) 1998. CODEN: PSADFZ. Publisher: American Chemical Society, Division of Fuel Chemistry.
AB Oxomolybdates impregnated on coal are excellent catalyst precursors in the liquefaction of Wyodak coal, esp. when sulfur is added during the reaction. The active catalysts are oxothiomolybdates. This paper discusses two approaches toward converting oxomolybdates into active catalyst and identifying the types of Mo-S Bonding that contribute toward their activity. In the first, several oxothiomolybdates having different forms of Mo-S bonds were prepd. in our lab. and impregnated onto Wyodak coal. THF dissoln. and resid conversion for these precursors were detd. both in the presence and absence of added **H2S.** In the second

approach, ammonium heptamolybdate was treated in flowing **H2S** in H2 at temps. to permit slow conversion of the oxomolybdate into its active form. The effect of this pretreatment on the activities of these catalyst impregnated coals were detd.

IT **12027-67-7**, Ammonium heptamolybdate **15060-55-6** **16150-60-0**
(conversion of oxo and thiomolybdates to active dispersed coal liquefaction catalysts)

RN 12027-67-7 HCA

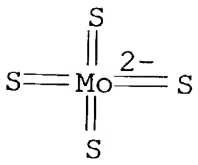
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

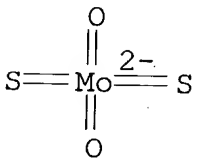
RN 15060-55-6 HCA

CN Molybdate(2-), tetrathioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

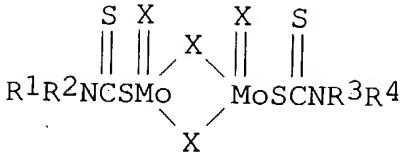
RN 16150-60-0 HCA
CN Molybdate(2-), dioxodithioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

CC 51-21 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67
IT 7439-98-7, Molybdenum, uses **12027-67-7**, Ammonium heptamolybdate **15060-55-6 16150-60-0**
(conversion of oxo and thiomolybdates to active dispersed coal liquefaction catalysts)

L27 ANSWER 7 OF 20 HCA COPYRIGHT 2004 ACS on STN
123:13509 A powdery molybdenum oxysulfide dithiocarbamate composition, a process for producing same, and a grease composition containing the composition.. Kamkura, Tamiji; Tanaka, Noriyoshi; Fukushima, Aritoshi; Tatsume, Yukio; Morita, Kazuhisa (Asahi Denka Kogyo K.K., Japan). Eur. Pat. Appl. EP 638582 A2 19950215, 15 pp. DESIGNATED STATES: R: BE, DE, ES, FR, GB, IT, LU, NL, SE. (English). CODEN: EPXXDW. APPLICATION: EP 1994-112498 19940810. PRIORITY: JP 1993-201498 19930813.
GI



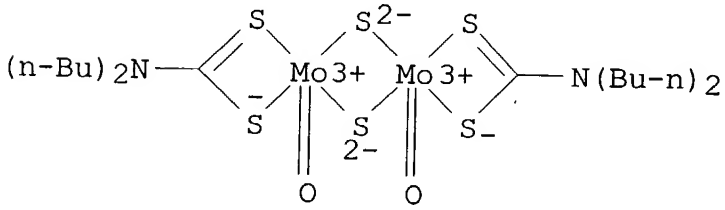
I

AB The powdery molybdenum oxysulfide dithiocarbamate compn. I, where R1, R2, R3 and R4 are independent hydrocarbyl groups and may be the same or different groups, and the total no. of carbon atoms contained in R1 to R4 is 4 to 36; and where X is sulfur or oxygen and the compn. of the total of all X's is given as SmOn in which n and m satisfy the ranges of 1.7 .ltoreq. m .ltoreq. 3.5 and 0.5 .ltoreq. n .ltoreq. 2.3, resp., and in which the constituent particles have diams. of not larger than 50.mu.m, has low corrosive action and excellent lubricity. The compn. is prepd. by reacting a molybdenum trioxide or an alkali metal salt or an ammonium salt of molybdic acid with alkali **hydrogen sulfide** or alkali sulfide (molar ratio 1:(1-2)), carbon disulfide, a secondary amine, and a mineral acid. The compn. is suitable for use in greases.

IT **60428-79-7P 90901-24-9P 155962-51-9P 163894-30-2P**
(molybdenum oxysulfide dithiocarbamate additive for lubricating greases)

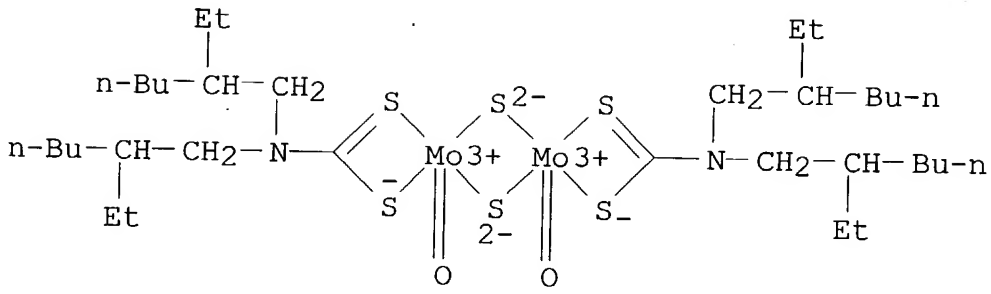
RN 60428-79-7 HCA

CN Molybdenum, bis(dibutylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi-, stereoisomer (9CI) (CA INDEX NAME)

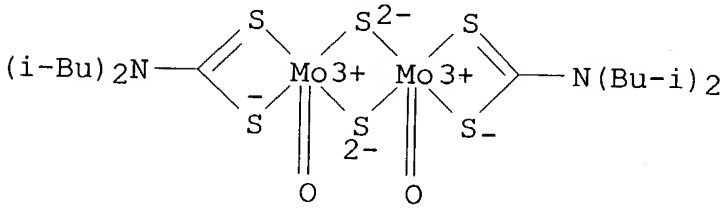


RN 90901-24-9 HCA

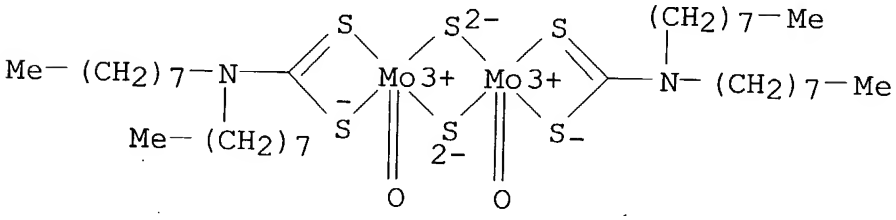
CN Molybdenum, bis[bis(2-ethylhexyl)carbamodithioato-.kappa.S,.kappa.S']dioxodi-.mu.-thioxodi- (9CI) (CA INDEX NAME)



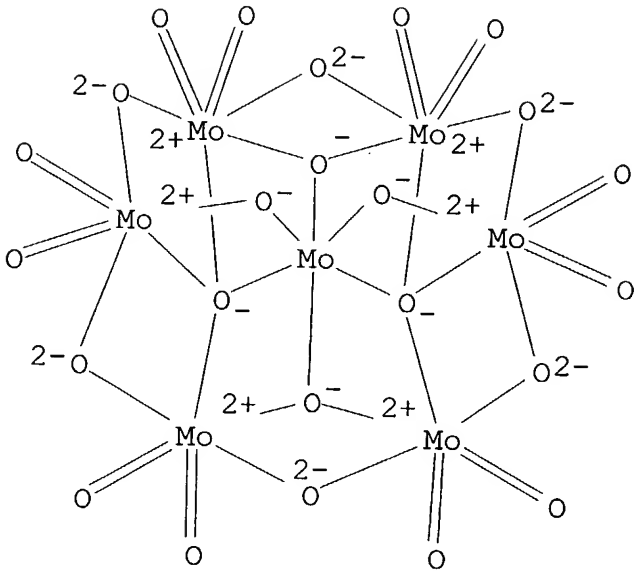
RN 155962-51-9 HCA
CN Molybdenum, bis[bis(2-methylpropyl)carbamodithioato-S,S']dioxodi-.mu.-thioxodi- (9CI) (CA INDEX NAME)



RN 163894-30-2 HCA
CN Molybdenum, bis(dioctylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi- (9CI) (CA INDEX NAME)



IT **12027-67-7**, Ammonium molybdate
(molybdenum oxysulfide dithiocarbamate additive for lubricating greases)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

IC ICM C07F011-00
ICS C10M163-00
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
IT **60428-79-7P 90901-24-9P 155962-51-9P 163894-30-2P**
(molybdenum oxysulfide dithiocarbamate additive for lubricating greases)
IT 64-17-5, Ethanol, reactions 67-56-1, Methanol, reactions 67-63-0, 2-Propanol, reactions 71-43-2, Benzene, reactions 75-15-0, Carbon disulfide, reactions 106-20-7, Di-2-ethylhexylamine 108-88-3, Toluene, reactions 110-96-3, Diisobutylamine 111-92-2, Dibutylamine 1120-48-5, Dioctyl amine 1310-61-8, Potassium **hydrogen sulfide** 1312-73-8, Potassium sulfide 1313-27-5, Molybdenum trioxide, reactions 1313-82-2, Sodium sulfide, reactions 1330-20-7, Xylene, reactions 7631-95-0, Sodium molybdate 7647-01-0, Hydrochloric acid, reactions 7782-91-4D, Molybdic acid, alkali metal or ammonium salt **12027-67-7**, Ammonium molybdate 12135-76-1, Ammonium sulfide 13446-49-6, Potassium molybdate 16721-80-5, Sodium **hydrogen sulfide**
(molybdenum oxysulfide dithiocarbamate additive for lubricating greases)

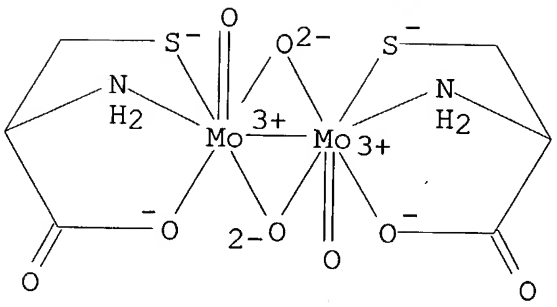
L27 ANSWER 8 OF 20 HCA COPYRIGHT 2004 ACS on STN
119:19258 Preparation, structure and properties of dinuclear, trinuclear incomplete cuboidal and cuboidal molybdenum-selenium cluster complexes. Nasreldin, Mohamed; Henkel, Gerald; Kampmann, Gunnar; Krebs, Bernt; Lamprecht, Gert J.; Routledge, Carol A.; Sykes, A. Geoffrey (Dep. Chem., Univ. Newcastle upon Tyne, NE1 7RU, UK). Journal of the Chemical Society, Dalton Transactions: Inorganic Chemistry (1972-1999) (5), 737-46 (English) 1993. CODEN: JCDTBI. ISSN: 0300-9246.

AB Prepn. of [MoV2O2(.mu.-Se)2(cys)2]2- (cysH = L-cysteine) and the related [Mo2O2(.mu.-Se)2(H2O)6]2+ enabled the trimolybdenum(IV) incomplete cuboidal Mo3OxSe4-x4+ (x = 0-3) complexes [Mo3(.mu.3-Se)(.mu.-Se)3(H2O)9]4+ [Mo3(.mu.3-Se)(.mu.-O)(.mu.-Se)2(H2O)9]4+, [Mo3(.mu.3-Se)(.mu.-O)2(.mu.-Se)(H2O)9]4+, [Mo3(.mu.3-Se)(.mu.-O)3(H2O)9]4+ and the mixed-valence (av. oxidn. state 3.25) cuboidal [Mo4(.mu.3-Se)4(H2O)12]5+ complex to be obtained. The crystal structures of Na[NMe4][Mo2O2(.mu.-Se)2(cys)2].7H2O, [NMe4]5[Mo3(.mu.3-Se)(.mu.-Se)3(NCS)9], [NMe4]5[Mo3(.mu.3-Se)(.mu.-O)2(.mu.-Se)(NCS)9] and [Mo4Se4(H2O)12](pts)5.14H2O (pts- = toluene-p-sulfonate) were detd. Electrolytic redn. of [Mo4(.mu.3-Se)4(H2O)12]5+ in 2M Hpts gives quant. air-sensitive [MoIII4(.mu.3-Se)4(H2O)12]4+ (Ef.degree. = 190 mV). Similarly the 5+ ion can be oxidized to the 6+ state (Ef.degree. = 790 mV). Compared to analogous Mo-S clusters, Mo-Se clusters exhibit identical structures but with longer bond distances, red shifted absorption bands, and in the case of the cuboidal aqua complexes less-pos. redn. potentials. By analogy with [Mo3S4(H2O)9]4+, [Mo3MSe4(H2O)10]4+ heterometal cuboidal and related complexes are obtained. The EDTA complex of the 5+ cube [Mo4Se4(EDTA)2]3- was prepd., and redn. potentials for the corresponding core 5+/4+ and 6+/5+ couples detd. as -40 and 650 mV, resp.

IT **26998-42-5P**
(formation and electrochem. redn. of, in presence of selenium followed by aerial oxidn.)

RN 26998-42-5 HCA

CN Molybdate(2-), bis[L-cysteinato(2-)-.kappa.N,.kappa.O,.kappa.S]di-.mu.-oxodioxodi-, (Mo-Mo)-, disodium (9CI) (CA INDEX NAME)

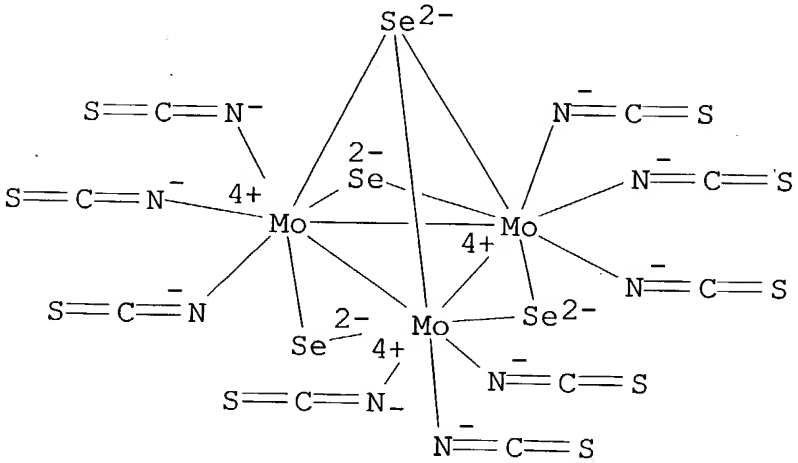


● 2 Na^+

IT **147893-30-9P 147893-32-1P 148219-04-9P**
(prepn. and crystal structure of)
RN 147893-30-9 HCA
CN Methanaminium, N,N,N-trimethyl-, tri-.mu.-selenoxo-.mu.3-selenoxononakis(thiocyanato-N)trimolybdate(5-) triangulo (5:1) (9CI) (CA INDEX NAME)

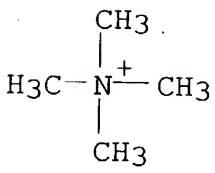
CM 1

CRN 147893-29-6
CMF C9 Mo3 N9 S9 Se4
CCI CCS



CM 2

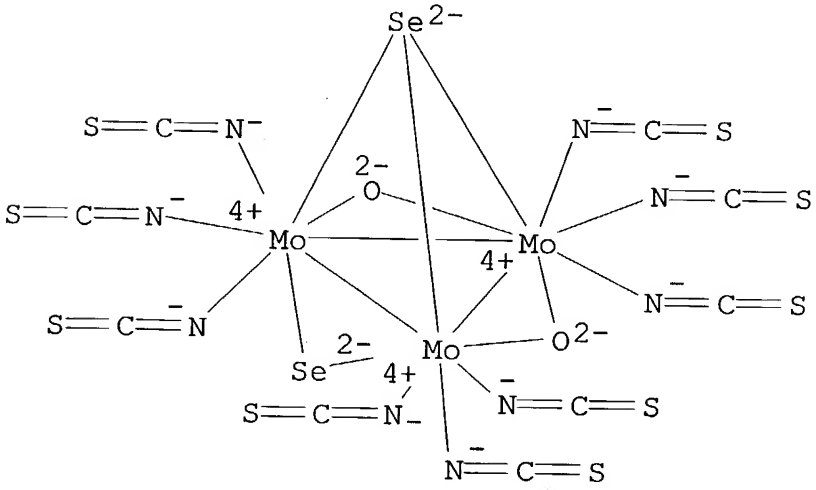
CRN 51-92-3
CMF C4 H12 N



RN 147893-32-1 HCA
CN Methanaminium, N,N,N-trimethyl-, di-.mu.-oxo-.mu.-selenoxo-.mu.3-selenoxononakis(thiocyanato-N)trimolybdate(5-) triangulo (5:1) (9CI) (CA INDEX NAME)

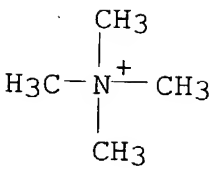
CM 1

CRN 147893-31-0
CMF C9 Mo3 N9 O2 S9 Se2
CCI CCS



CM 2

CRN 51-92-3
CMF C4 H12 N



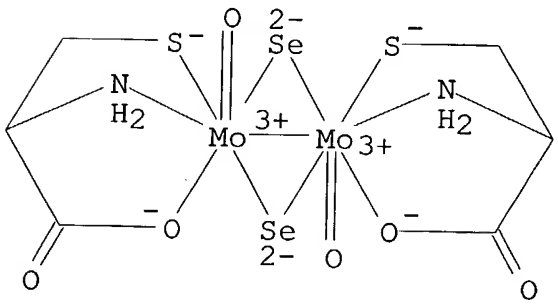
RN 148219-04-9 HCA
CN Methanaminium, N,N,N-trimethyl-, sodium stereoisomer of bis[L-cysteinato(2-)-N,O,S]dioxodi-.mu.-selenoxodimolybdate(2-) (Mo-Mo) (1:1:1), heptahydrate (9CI) (CA INDEX NAME)

CM 1

CRN 148219-03-8
CMF C6 H10 Mo2 N2 O6 S2 Se2 . C4 H12 N . Na

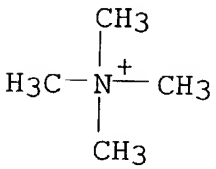
CM 2

CRN 148219-02-7
CMF C6 H10 Mo2 N2 O6 S2 Se2
CCI CCS

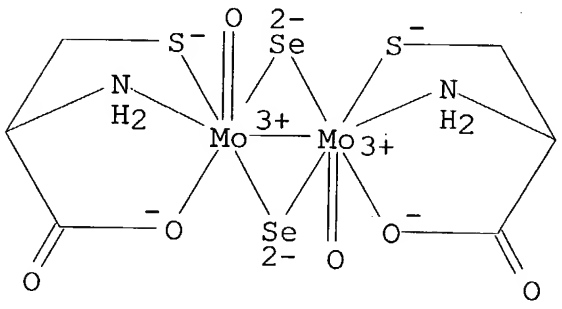


CM 3

CRN 51-92-3
CMF C4 H12 N

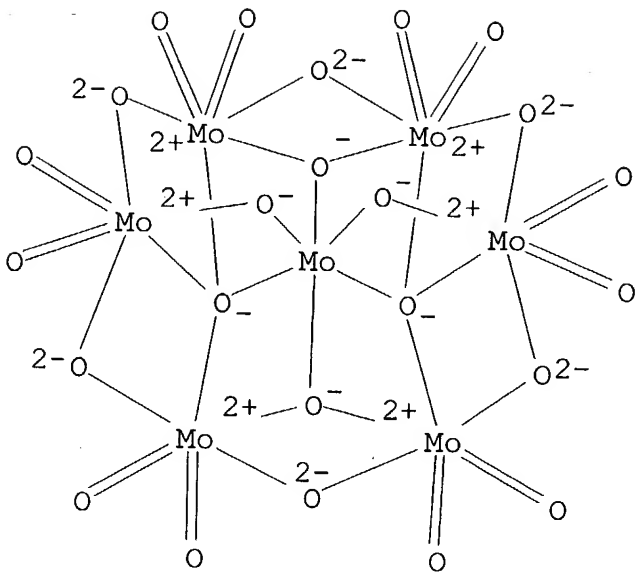


IT **148161-50-6P**
(prepn. and mol. structure and aquation and redn. of)
RN 148161-50-6 HCA
CN Molybdate(2-), bis[L-cysteinato(2-)-N,O,S]dioxodi-.mu.-selenoxodi-, (Mo-Mo), dicesium, stereoisomer (9CI) (CA INDEX NAME)



●2 Cs^+

IT **12027-67-7**, Ammonium molybdate ((NH4)6Mo7O24))
(reaction of, with cysteine and selenide or hydrazine)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

IT **7783-06-4D, Hydrogen sulfide** (**H2S**), molybdenum complex
(with EDTA, redn. potential of)
RN 7783-06-4 HCA
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75
IT **26998-42-5P**
(formation and electrochem. redn. of, in presence of selenium followed by aerial oxidn.)
IT 129681-93-2P **147893-30-9P 147893-32-1P**
148219-04-9P
(prepn. and crystal structure of)
IT **148161-50-6P**
(prepn. and mol. structure and aquation and redn. of)
IT **12027-67-7**, Ammonium molybdate ((NH4)6Mo7O24)
(reaction of, with cysteine and selenide or hydrazine)
IT **7783-06-4D, Hydrogen sulfide** (**H2S**), molybdenum complex

(with EDTA, redn. potential of)

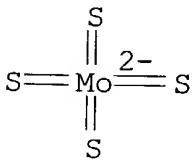
L27 ANSWER 9 OF 20 HCA COPYRIGHT 2004 ACS on STN
118:168764 Benzyltriethylammonium tetrathiomolybdate: an improved sulfur transfer reagent for the synthesis of disulfides. Ramesha, A. R.; Chandrasekaran, S. (Dep. Org. Chem., Indian Inst. Sci., Bangalore, 560 012, India). Synthetic Communications, 22(22), 3277-84 (English) 1992. CODEN: SYNCAV. ISSN: 0039-7911. OTHER SOURCES: CASREACT 118:168764.

AB Benzyltriethylammonium tetrathiomolybdate is a superior reagent for the conversion of alkyl halides to the corresponding disulfides in chloroform at room temp. Thus, 4-O2NC6H4CH2Br was treated with (PhCH2NEt3)2MoS4 in CHCl3 to give 80% 4-O2NC6H4CH2SSCH2C6H4NO2-4.

IT **15060-55-6P**
(prepn. and reaction of, with benzyltriethylammonium chloride)

RN 15060-55-6 HCA

CN Molybdate(2-), tetrathioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)

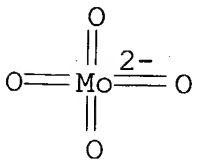


●2 NH_4^+

IT **13106-76-8**, Ammonium molybdate
(reaction of, with **hydrogen sulfide** in synthesis of benzyltriethylammonium tetrathiomolybdate)

RN 13106-76-8 HCA

CN Molybdate (MoO42-), diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

IT **146785-42-4**
(reagent, for conversion of alkyl halides to disulfides, prepn. of)
RN 146785-42-4 HCA
CN Benzenemethanaminium, N,N,N-triethyl-, (T-4)-tetrathioxomolybdate(2-) (2:1) (9CI) (CA INDEX NAME)

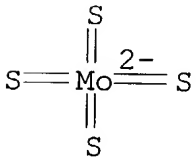
CM 1

CRN 16652-03-2
CMF C13 H22 N

$Et_3{}^{+}N-CH_2-Ph$

CM 2

CRN 16330-92-0
CMF Mo S4
CCI CCS



CC 25-9 (Benzene, Its Derivatives, and Condensed Benzenoid Compounds)
IT **15060-55-6P**
(prepn. and reaction of, with benzyltriethylammonium chloride)
IT **13106-76-8**, Ammonium molybdate
(reaction of, with **hydrogen sulfide** in synthesis of benzyltriethylammonium tetrathiomolybdate)
IT **146785-42-4**
(reagent, for conversion of alkyl halides to disulfides, prepn. of)

L27 ANSWER 10 OF 20 HCA COPYRIGHT 2004 ACS on STN
118:24625 Ternary molybdenum chalcogenides, and their manufacture. Rabiller-Baudry, Murielle; Faure, Annicke; Lesparre, Jean; Sergent, Marcel; Chevrel, Roger (Atochem, Fr.). Fr. Demande FR 2667587 A1 19920410, 16 pp. (French). CODEN: FRXXBL. APPLICATION: FR 1991-188 19910109.
AB The chalcogenides have general formula MxMo6S8 (x = 0-4; M = metal) and are deposited on a porous support. The chalcogenides are

manufd. by reducing MoS2 and a metal M, or their precursors, deposited on porous supports by impregnation, with H. The chalcogenides are mech. more resistant than the prior-art catalysts, and are used as oxychlorination catalysts. A dispersion of Al2O3 10 in a soln. of (NH4)6Mo7O24.4H2O 1.5 and Cu(NO3).3H2O 1.36 g in 5 mL concd. NH4OH was left on the air for 1.5 h, dried in air at 120.degree. for 2 h, the material was calcined in air at 500.degree. for 2 h, sulfided with **H2S** at 400.degree. for 30 min, and reduced with H (1.5 mL/s) for 49 h to give a mixt. of CuxMo6S8 and MoS2 (by x-ray; K threshold of Mo). C2H4 4.4 was oxychlorinated at 230.degree. in a mixt. of air 16.2 and HCl 8.6 std. L/h using Cu2.5Mo6S8 4.25 on Al2O3 6.00 and SiO2 22.60 g. The conversion of C2H4 was 78.5 and the selectivity for C2H4Cl2 99.2, vs. 72.3 and 99.1 for a conventional catalyst.

IT **7783-06-4, Hydrogen sulfide,** reactions
(reaction of, with ammonium heptamolybdate-cupric nitrate mixts. on alumina, for copper molybdenum sulfide-molybdenum disulfide oxychlorination catalyst manuf.)

RN 7783-06-4 HCA

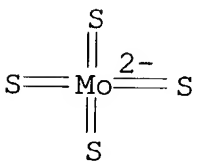
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

IT **15060-55-6,** Ammonium molybdenum sulfide [(NH4)2MoS4]
(reaction of, with cupric chloride, for copper molybdenum sulfide, for oxychlorination catalysts)

RN 15060-55-6 HCA

CN Molybdate(2-), tetrathioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)

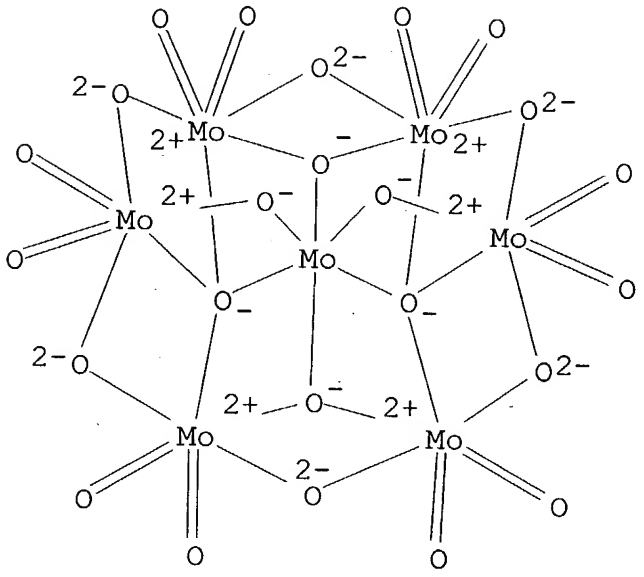


●2 NH_4^+

IT **12027-67-7,** Ammonium heptamolybdate
(reaction of, with cupric nitrate, on alumina, in copper molybdenum sulfide-molybdenum disulfide oxychlorination catalyst manuf.)

RN 12027-67-7 HCA

CN Molybdate (Mo7O24 6-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

IC ICM C01G039-06
ICS C01G003-12
CC 49-5 (Industrial Inorganic Chemicals)
Section cross-reference(s): 67
IT **7783-06-4, Hydrogen sulfide,** reactions
(reaction of, with ammonium heptamolybdate-cupric nitrate mixts. on alumina, for copper molybdenum sulfide-molybdenum disulfide oxychlorination catalyst manuf.)
IT **15060-55-6,** Ammonium molybdenum sulfide [(NH4)2MoS4]
(reaction of, with cupric chloride, for copper molybdenum sulfide, for oxychlorination catalysts)
IT 3251-23-8, Cupric nitrate **12027-67-7,** Ammonium heptamolybdate
(reaction of, with cupric nitrate, on alumina, in copper molybdenum sulfide-molybdenum disulfide oxychlorination catalyst manuf.)

L27 ANSWER 11 OF 20 HCA COPYRIGHT 2004 ACS on STN
111:236408 Dispersed-phase catalysts in coal liquefaction. Utz, Bruce R.; Cugini, Anthony V.; Frommell, Elizabeth A. (Dep. Energy, Pittsburgh Energy Technol. Cent., Pittsburgh, PA, 15236, USA). Preprints of Papers - American Chemical Society, Division of Fuel

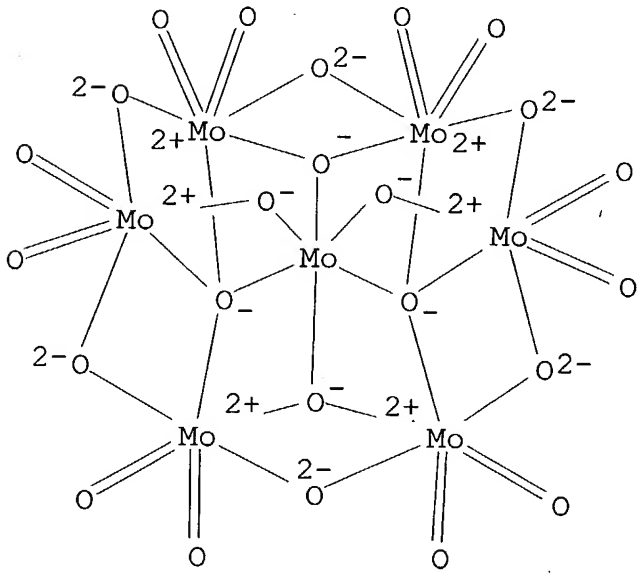
Chemistry, 34(4), 1423-30 (English) 1989. CODEN: ACFPAI. ISSN: 0569-3772.

AB Two catalyst precursors that result in high conversions of coal to solvent-sol. products were identified when heated rapidly to reaction temp. The use of MoS3 and (NH4)2MoS4 as catalyst precursors, rather than (NH4)6Mo2O24 , offers a no. of advantages. Both catalyst precursors are in a sulfided form and therefore addnl. **H2S** is not required, but (NH4)6Mo2O24 requires the addn. of **H2S** in order to form the oxysulfide intermediates and the final product, MoS2. Both of the sulfided precursors are activated and highly dispersed when heated rapidly to reaction temp., while (NH4)6Mo7O24 requires a gradual heating , so the activation of (NH4)6Mo7O24 is much more energy intensive. The ultimate goal is to identify a dry, highly dispersed catalyst precursor or catalyst that can be added to a coal-vehicle feed without the addn. of water and that results in yields of coal-derived products comparable to those given by water- or oil-sol. catalyst precursors. Possibly MoS3 is the catalyst precursor that satisfies those requirements.

IT **12027-67-7**, Ammonium heptamolybdate **15060-55-6**
(precursors, for molybdenum disulfide catalysts, for coal hydroliquefaction)

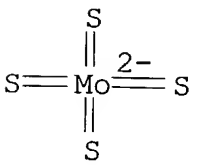
RN 12027-67-7 HCA

CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



●6 NH_4^+

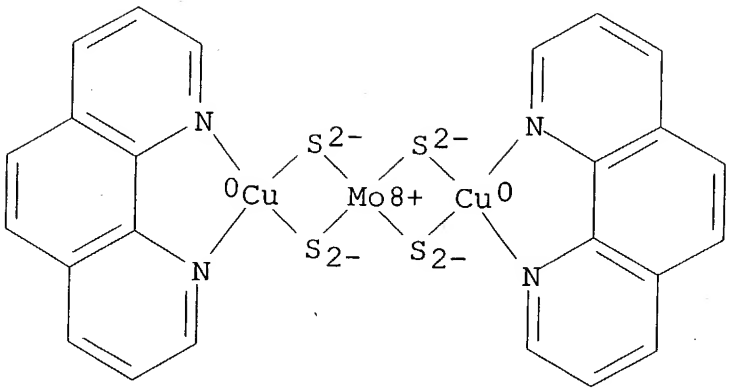
RN 15060-55-6 HCA
CN Molybdate(2-), tetrathioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

CC 51-21 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67
IT 1317-33-5, Molybdenum disulfide, uses and miscellaneous
12027-67-7, Ammonium heptamolybdate **15060-55-6**
(precursors, for molybdenum disulfide catalysts, for coal hydroliquefaction)

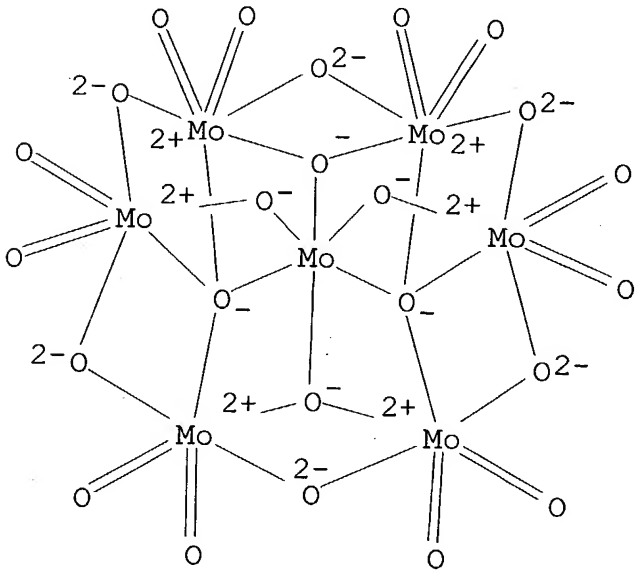
L27 ANSWER 12 OF 20 HCA COPYRIGHT 2004 ACS on STN
111:16692 Difference in the antagonistic behavior of tetrathiomolybdate and tetrathiotungstate towards copper. Mishra, S. B. S.; Sarkar, S. (Inst. Eng. Technol., Lucknow, 226 020, India). Indian Journal of Chemistry, Section A: Inorganic, Physical, Theoretical & Analytical, 28A(1), 72-3 (English) 1989. CODEN: IJCADU. ISSN: 0376-4710.
AB Freshly-pptd. CuS can be solubilized by allowing it to stand in aq. medium contg. MoS42-. [(PPh3)3Cu2MoS4] and [(phen)2Cu2MoS4] (phen = o-phenanthroline) were isolated by reaction of the resultant soln. with PPh3 and phen which indicate the in situ generation of {Cu2MoS4} species. The reaction was carried out to mimic a possible reaction in the rumen and to rationalize the chem. implications of Cu-Mo antagonism. A dramatic difference in the antagonistic behavior of MoS42- and WS42- towards Cu was demonstrated.
IT **106639-21-8P**
(prepn. of, from heptamolybdate and copper chloride and **hydrogen sulfide** followed by reaction with phenanthroline)
RN 106639-21-8 HCA
CN Molybdenum, bis[(1,10-phenanthroline-N1,N10)copper]tetra-.mu.-thioxo- (9CI) (CA INDEX NAME)



IT **12027-67-7**, Ammonium molybdate ((NH4)6Mo7O24) (reaction of, with copper dichloride and **hydrogen sulfide** followed by reaction with triphenylphosphine or phenanthroline)

RN 12027-67-7 HCA

CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

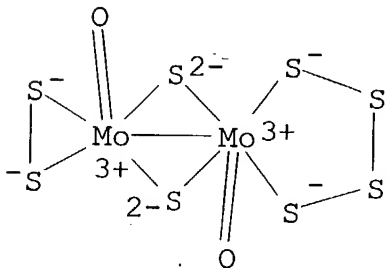
CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 6

IT **106639-21-8P**
(prepn. of, from heptamolybdate and copper chloride and **hydrogen sulfide** followed by reaction with phenanthroline)
IT 74542-94-2P
(prepn. of, from heptamolybdate and copper chloride and **hydrogen sulfide** followed by reaction with triphenylphosphine)
IT **12027-67-7**, Ammonium molybdate ((NH4)6Mo7O24)
(reaction of, with copper dichloride and **hydrogen sulfide** followed by reaction with triphenylphosphine or phenanthroline)

L27 ANSWER 13 OF 20 HCA COPYRIGHT 2004 ACS on STN
107:167677 Preparation and structure of the cluster compound (Et4N)2(Mo2O2S8). Zhang, Shiwei; Liao, Daiqing; Jin, Xianglin; Tang, Youqi (Phys. Chem. Inst., Peking Univ., Beijing, Peop. Rep. China). Gaodeng Xuexiao Huaxue Xuebao, 8(2), 173-5 (Chinese) 1987. CODEN: KTHPDM. ISSN: 0251-0790.
AB (Et4N)2(Mo2O2S8) was prepd., and its crystal and mol. structures were detd. The compd. crystallizes in orthorhombic, space group Pbca with Z = 8, a 13.197(4), b 15.739(6), c 29.033(6) .ANG.. The compd. contains terminal O ligand, persulfide group, tetrasulfide group, and .mu.-sulfide group, and has a metal-metal bond (Mo-Mo distance 2.822(3).ANG.).
IT **110725-32-1P**
(prepn. and crystal structure of)
RN 110725-32-1 HCA
CN Ethanaminium, N,N,N-triethyl-, stereoisomer of (dithio)dioxo(tetrathio)di-.mu.-thioxodimolybdate(2-) (Mo-Mo) (2:1) (9CI) (CA INDEX NAME)

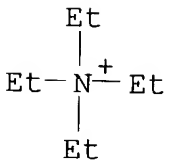
CM 1

CRN 95357-49-6
CMF Mo2 O2 S8
CCI CCS

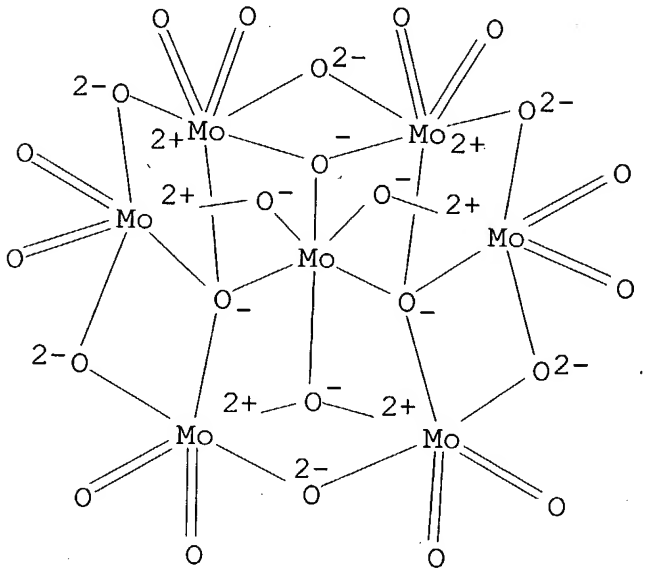


CM 2

CRN 66-40-0
CMF C8 H20 N



IT **12027-67-7**
(reaction of, with **hydrogen sulfide**)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75
IT **110725-32-1P**
(prepn. and crystal structure of)
IT **12027-67-7**
(reaction of, with **hydrogen sulfide**)

(1449)

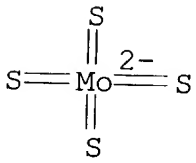
L27 ANSWER 14 OF 20 HCA COPYRIGHT 2004 ACS on STN
105:117551 Ammonium tetrathiomolybdate. Reilly, Kenneth T.; Munn, Robin W.; Hoffman, Henry E.; Douglas, Alan D. (GTE Products Corp., USA). U.S. US 4604278 A 19860805, 3 pp. (English). CODEN: USXXAM. APPLICATION: US 1985-734985 19850517.

AB Ammonium tetrathiomolybdate (I), useful as a precursor for MoS2 catalysts and lubricants, is prepd. on a com. scale by treating an ammoniacal molybdate soln. with 0.5-250 psi **H2S** in a closed system to give a slurry contg. I, which is sepd., washed with water and EtOH, and dried. The wash water may be recycled to the 1st step. Thus, a soln. prepd. from 13 gal 15N NH4OH and 5.0 kg ammonium paramolybdate (II) was treated in a sealed tank with 5-8 psi **H2S** for 3 h, and at 5-10 psi for 30 min. The resulting slurry was cooled and filtered, and the solid was washed and dried to give 10-15 lb I. The mother liquor 6.5 gal was recycled with further 6.5 gal NH4OH and 5 kg II to give an addnl. 15-20 lb I.

IT **15060-55-6P**
(prepn. of, as precursor for molybdenum sulfide catalysts and lubricants)

RN 15060-55-6 HCA

CN Molybdate(2-), tetrathioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

IT **7783-06-4**, reactions
(reaction of, with ammonium molybdate, for ammonium thiomolybdate prepn.)

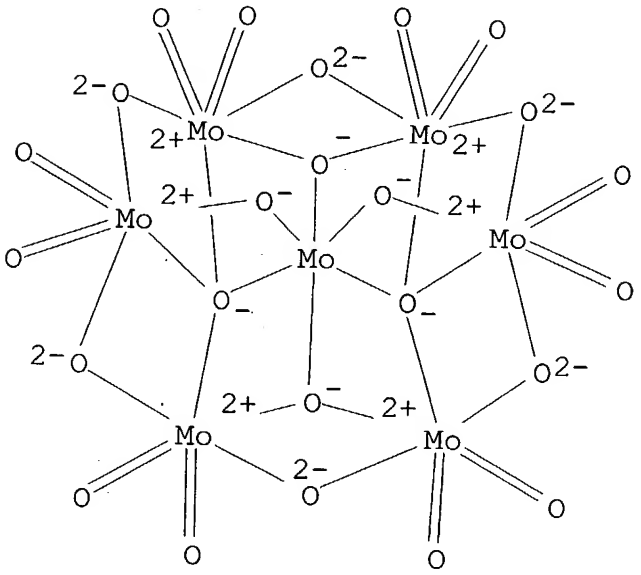
RN 7783-06-4 HCA

CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

IT **12027-67-7**
(reaction of, with **hydrogen sulfide**, for

ammonium thiomolybdate prepn.)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

IC ICM C01G039-00
NCL 423517000
CC 49-5 (Industrial Inorganic Chemicals)
Section cross-reference(s): 51, 67
ST ammonium thiomolybdate molybdenum sulfide precursor; **hydrogen sulfide** reaction ammonium molybdate
IT **15060-55-6P**
(prepn. of, as precursor for molybdenum sulfide catalysts and lubricants)
IT **7783-06-4**, reactions
(reaction of, with ammonium molybdate, for ammonium thiomolybdate prepn.)
IT **12027-67-7**
(reaction of, with **hydrogen sulfide**, for ammonium thiomolybdate prepn.)

L27 ANSWER 15 OF 20 HCA COPYRIGHT 2004 ACS on STN
104:36795 Catalysts from molybdenum polysulfide precursors, and their use. Mitchell, Howard L., III; Sawyer, Willard H. (Exxon Research and Engineering Co. , USA). U.S. US 4542121 A 19850917, 11 pp.

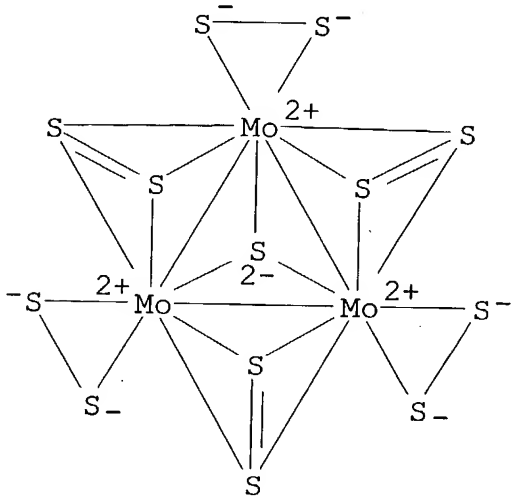
Cont.-in-part of U.S. 4,430, 442. (English). CODEN: USXXAM. APPLICATION: US 1984-570364 19840113. PRIORITY: US 1982-399947 19820720.

AB Hydrogenation-hydrodenitrogenation-hydrodesulfurization catalysts for petroleum refining are prepd. by decompg. in-situ (i.e., in the presence of **H2S**, H, and hydrocarbons) a catalyst precursor salt, A(Mo3S13), in which A is an ammonium or phosphonium ion. The precursor salt, prepd. from (NH4)6Mo7O24 and (NH4)2Sx, can be exchanged with Me4NCl or Co(OAc)2 (or both) to form an org. (or Co-exchanged) precursor with Co-Mo wt. ratio 1:5.35-6.9; the precursor can also be supported on Al2O3. Catalyst precursors decompd. in-situ (preferably at 350.degree.) are significantly more active than those decompd. in N.

IT **67031-31-6 89420-48-4**
(catalyst precursor, for petroleum hydrorefining)

RN 67031-31-6 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)



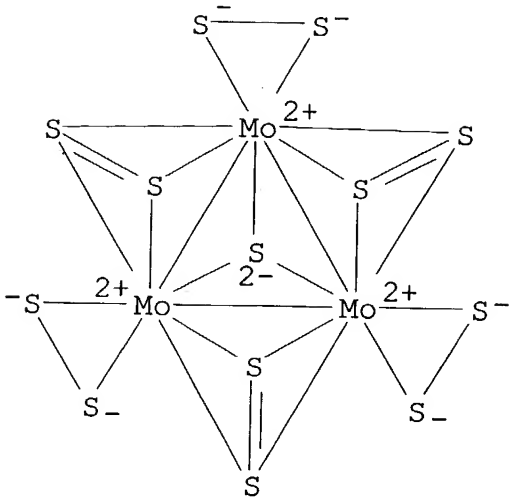
●2 NH_4^+

RN 89420-48-4 HCA

CN Methanaminium, N,N,N-trimethyl-, tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotrimolybdate(2-) (2:1) (9CI) (CA INDEX NAME)

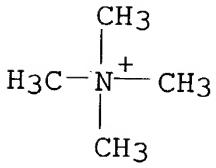
CM 1

CRN 88765-92-8
CMF Mo3 S13
CCI CCS

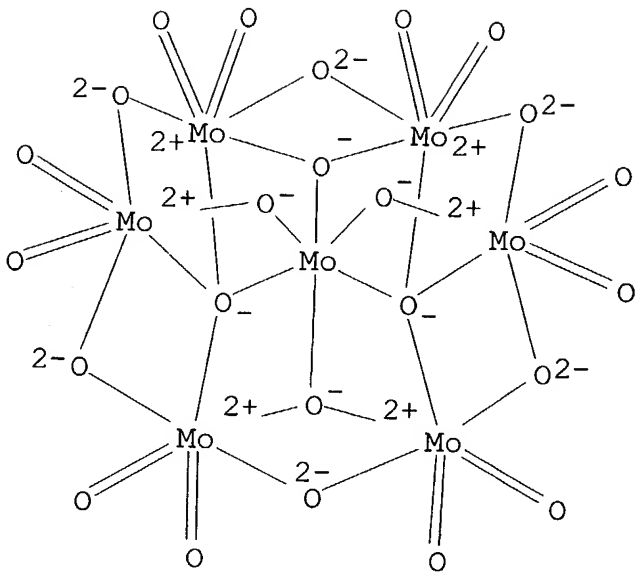


CM 2

CRN 51-92-3
CMF C4 H12 N



IT **12027-67-7**
(polysulfide catalysts precursors from, for petroleum hydrorefining)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

IC ICM B01J027-02
ICS B01J031-02; B01J027-24; C01G037-00
NCL 502220000
CC 51-9 (Fossil Fuels, Derivatives, and Related Products)
IT **67031-31-6 89420-48-4**
(catalyst precursor, for petroleum hydrorefining)
IT 71-48-7 75-57-0 **12027-67-7**
(polysulfide catalysts precursors from, for petroleum hydrorefining)

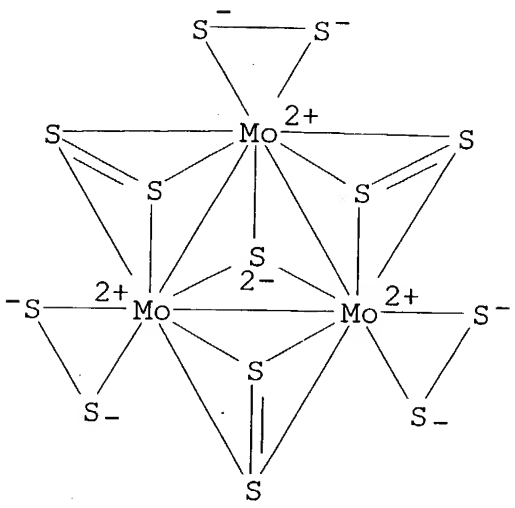
L27 ANSWER 16 OF 20 HCA COPYRIGHT 2004 ACS on STN
100:142038 Catalysts from molybdenum polysulfide precursors. Sawyer, Willard H.; Mitchell, Howard L., III (Exxon Research and Engineering Co. , USA). U.S. US 4430442 A 19840207, 11 pp. (English). CODEN: USXXAM. APPLICATION: US 1982-399947 19820720.
AB Hydrogenation-hydrodenitrogenation-hydrodesulfurization catalysts for petroleum refining are prepd. by decompg. in-situ (i.e., in the presence of **H2S**, H, and hydrocarbons) a catalyst precursor salt, A(Mo3S13), where A is formed from an ammonium compd. The precursor salt, prepd. from (NH4)6Mo7O24 and (NH4)2Sx, can be exchanged with Me4NCl [75-57-0] or Co(OAc)2 [71-48-7] (or both) to form an org. (or Co-exchanged, with Co-Mo wt. ratio 1:5.35-6.9) precursor; the precursor can also be supported on Al2O3. Catalyst

precursors decompd. in-situ (preferably at 350.degree.) are significantly more active than those decompd. in N.

IT **67031-31-6 89420-48-4**
(catalyst precursor, for petroleum hydrorefining)

RN 67031-31-6 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)



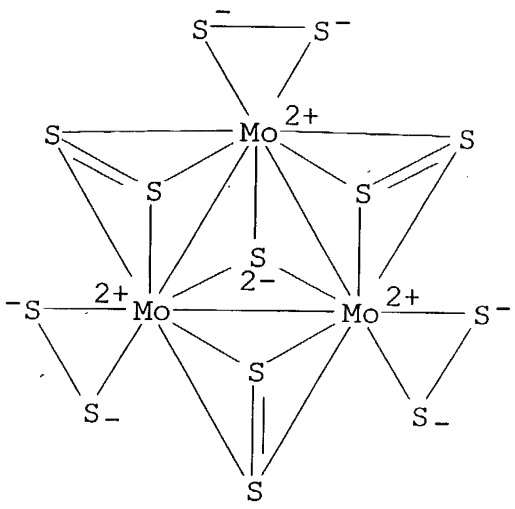
● 2 NH_4^+

RN 89420-48-4 HCA

CN Methanaminium, N,N,N-trimethyl-, tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotrimolybdate(2-) (2:1) (9CI) (CA INDEX NAME)

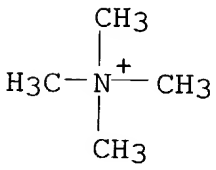
CM 1

CRN 88765-92-8
CMF Mo3 S13
CCI CCS

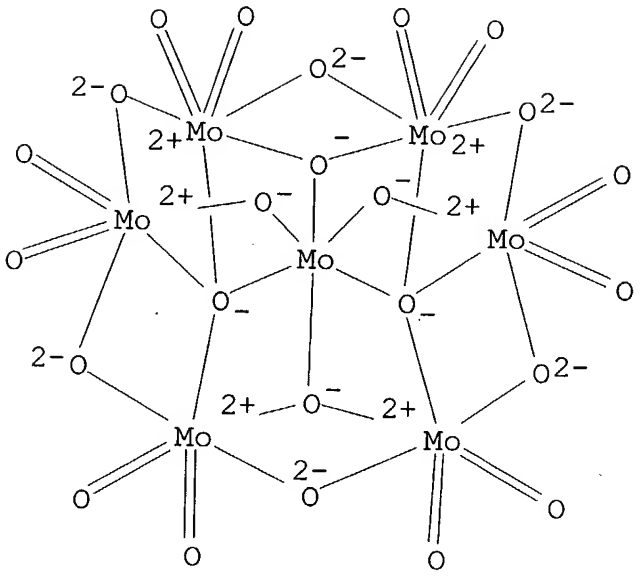


CM 2

CRN 51-92-3
CMF C4 H12 N



IT **12027-67-7**
(polysulfide catalyst precursors from, for petroleum hydrorefining)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



●6 NH_4^+

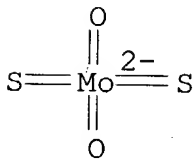
IC B01J027-02; B01J031-12; B01J027-24
NCL 502220000
CC 51-10 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67
IT **67031-31-6 89420-48-4**
(catalyst precursor, for petroleum hydrorefining)
IT 71-48-7 75-57-0 **12027-67-7**
(polysulfide catalyst precursors from, for petroleum hydrorefining)

L27 ANSWER 17 OF 20 HCA COPYRIGHT 2004 ACS on STN
99:98107 Syntheses and characterization of ammonium and tetraalkylammonium thiomolybdates and thiotungstates. McDonald, John W.; Friesen, G. Delbert; Rosenhein, Laurence D.; Newton, William E. (Charles F. Kettering Res. Lab., Yellow Springs, OH, 45387, USA). Inorganica Chimica Acta, 72(2), 205-10 (English) 1983. CODEN: ICHAA3. ISSN: 0020-1693.
AB Improved methods for the prepn. of [NH4]2[MO2S2] and [NH4]2[MS4] (M = Mo, W) are summarized and new syntheses of [NH4]2[MOS3] are reported. The facile conversion of the NH4+ salts to Et4N+ salts via reaction with aq. Et4NOH is also described. IR and electronic spectral data for the thiometallates are summarized as an aid to future characterization.

IT **86915-91-5P**
(prepn. from diammonium dioxodithiomolybdate and tetraethylammonium hydroxide)
RN 86915-91-5 HCA
CN Ethanaminium, N,N,N-triethyl-, (T-4)-dioxodithioxomolybdate(2-) (2:1) (9CI) (CA INDEX NAME)

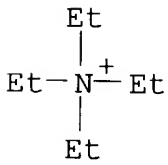
CM 1

CRN 16608-22-3
CMF Mo O2 S2
CCI CCS



CM 2

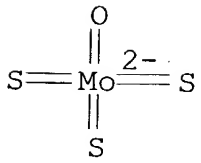
CRN 66-40-0
CMF C8 H20 N



IT **86915-90-4P**
(prepn. from diammonium oxotrithiomolybdate and tetraethylammonium hydroxide)
RN 86915-90-4 HCA
CN Ethanaminium, N,N,N-triethyl-, (T-4)-oxotrithioxomolybdate(2-) (2:1) (9CI) (CA INDEX NAME)

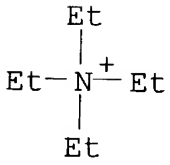
CM 1

CRN 19452-56-3
CMF Mo O S3
CCI CCS



CM 2

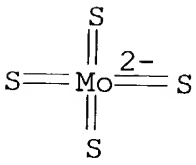
CRN 66-40-0
CMF C8 H20 N



IT **14348-09-5P**
(prepn. from diammonium tetrathiomolybdate and tetraethylammonium hydroxide)
RN 14348-09-5 HCA
CN Ethanaminium, N,N,N-triethyl-, (T-4)-tetrathioxomolybdate(2-) (2:1) (9CI) (CA INDEX NAME)

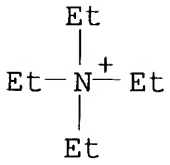
CM 1

CRN 16330-92-0
CMF Mo S4
CCI CCS

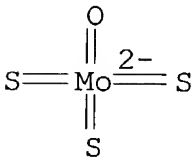


CM 2

CRN 66-40-0
CMF C8 H20 N

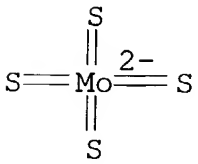


IT **42761-49-9P**
(prepn. from disodium molybdate and ammonium hydroxide and **hydrogen sulfide** and reaction with tetraethylammonium hydroxide)
RN 42761-49-9 HCA
CN Molybdate(2-), oxotrithioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



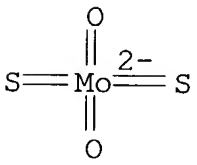
●2 NH_4^+

IT **15060-55-6P**
(prepn. from disodium molybdate or hexaammonium heptamolybdate and ammonium hydroxide and **hydrogen sulfide** and reaction with tetraethylammonium hydroxide)
RN 15060-55-6 HCA
CN Molybdate(2-), tetrathioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



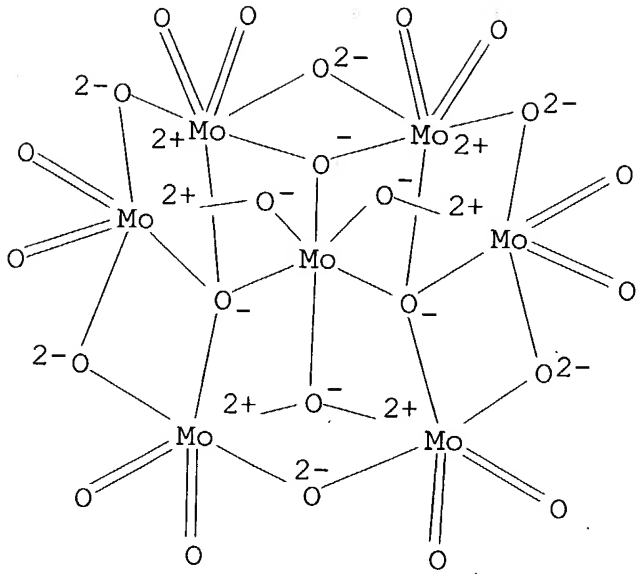
●2 NH_4^+

IT **16150-60-0P**
(prepn. from hexaammonium heptamolybdate and ammonium hydroxide and **hydrogen sulfide** and reaction with tetraethylammonium hydroxide)
RN 16150-60-0 HCA
CN Molybdate(2-), dioxodithioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

IT **12027-67-7**
(reactions with cesium chloride or ammonium hydroxide and **hydrogen sulfide**, oxo- or oxothiomolybdate salts from)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

CC 78-5 (Inorganic Chemicals and Reactions)

IT **86915-91-5P**
(prepn. from diammonium dioxodithiomolybdate and tetraethylammonium hydroxide)

IT **86915-90-4P**
(prepn. from diammonium oxotrithiomolybdate and tetraethylammonium hydroxide)

IT **14348-09-5P**
(prepn. from diammonium tetrathiomolybdate and tetraethylammonium hydroxide)

IT **42761-49-9P**
(prepn. from disodium molybdate and ammonium hydroxide and **hydrogen sulfide** and reaction with tetraethylammonium hydroxide)

IT **15060-55-6P**
(prepn. from disodium molybdate or hexaammonium heptamolybdate and ammonium hydroxide and **hydrogen sulfide** and reaction with tetraethylammonium hydroxide)

IT **16150-60-0P**
(prepn. from hexaammonium heptamolybdate and ammonium hydroxide and **hydrogen sulfide** and reaction with tetraethylammonium hydroxide)

IT 86915-92-6P

(prepn. from hexaammonium heptamolybdate and cesium chloride and **hydrogen sulfide**)

IT 13862-78-7P 16150-61-1P 52748-63-7P
(prepn. from tungstic acid and ammonium hydroxide and **hydrogen sulfide** and reaction with tetraethylammonium hydroxide)

IT **12027-67-7**
(reactions with cesium chloride or ammonium hydroxide and **hydrogen sulfide**, oxo- or oxothiomolybdate salts from)

L27 ANSWER 18 OF 20 HCA COPYRIGHT 2004 ACS on STN

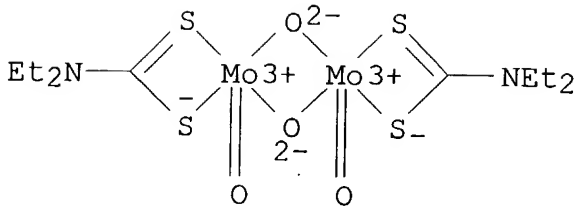
89:69916 Synthesis and electrochemistry of oxo- and sulfido-bridged molybdenum(V) complexes with 1,1-dithiolate ligands. Schultz, Franklin A.; Ott, Virginia R.; Rolison, Debra S.; Bravard, Dudley C.; McDonald, John W.; Newton, William E. (Dep. Chem., Florida Atlantic Univ., Boca Raton, FL, USA). Inorganic Chemistry, 17(7), 1758-65 (English) 1978. CODEN: INOCAJ. ISSN: 0020-1669.

AB A no. of oxo- and sulfido-bridged Mo(V) complexes with the 1,1-dithiolate ligands, N,N-diethyldithiocarbamate (dtc), diisopropyldithiophosphinate (dtp), and 1,1-dicyanoethylene-2,2-dithiolate (mnt), were prepd. The dtc complexes constitute the first series of compds. in which bridging and terminal oxo groups have been sequentially replaced by sulfido in the binuclear Mo2X42+ core to yield all members of a single family from Mo2O4(dtc)2 to Mo2S4(dtc)2. The IR spectra reveal the characteristic behavior of Mo-O and Mo-S stretching frequencies in the binuclear unit following O or S substitution at the bridging or terminal positions. Electrochem. of the compds. in Me2SO was studied by cyclic voltammetry, chronoamperometry, and conrolled-potential coulometry. The sulfido-bridged dtc and mnt complexes undergo successive one-electron redns. to Mo(V)-Mo(IV) and Mo(IV)-Mo(IV) species. The ease of prodn. and chem. stability of the one- and two-electron redn. products increase with increasing S substitution, although none of these products are stable on an extended time scale. The effect of ligand on electrochem. behavior, possible mechanisms for decompn. of the Mo(V)-Mo(IV) species, and comparisons to previous electrochem. studies of sulfido-bridged Mo(V)-Mo(V) complexes in nonaq. media are discussed.

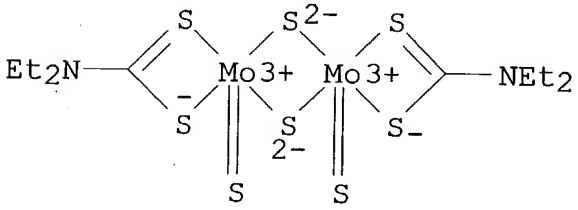
IT **50860-31-6**
(electrochem. redn. of)

RN 50860-31-6 HCA

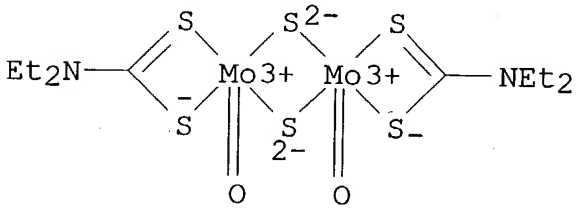
CN Molybdenum, bis(diethylcarbamodithioato-.kappa.S,.kappa.S')di-.mu.-oxodioxodi- (9CI) (CA INDEX NAME)



IT **36539-27-2P 55723-33-6P 59389-04-7P**
63912-48-1P 66290-40-2P
(prepn. and electrochem. redn. of)
RN 36539-27-2 HCA
CN Molybdenum, bis(diethylcarbamodithioato-.kappa.S,.kappa.S')di-.mu.-thioxodithioxodi- (9CI) (CA INDEX NAME)



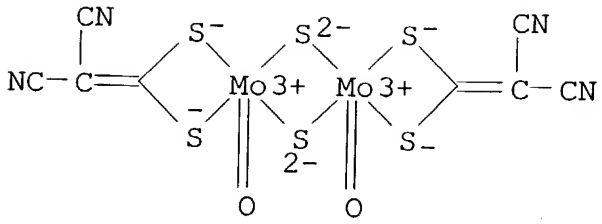
RN 55723-33-6 HCA
CN Molybdenum, bis(diethylcarbamodithioato-.kappa.S,.kappa.S')dioxodi-.mu.-thioxodi- (9CI) (CA INDEX NAME)



RN 59389-04-7 HCA
CN 1-Butanaminium, N,N,N-tributyl-, stereoisomer of bis[(dimercaptomethylene)propanedinitrilato(2-)-S,S']dioxodi-.mu.-thioxodimolybdate(2-) (2:1) (9CI) (CA INDEX NAME)

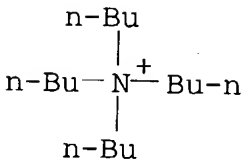
CM 1

CRN 59389-03-6
CMF C8 Mo2 N4 O2 S6
CCI CCS

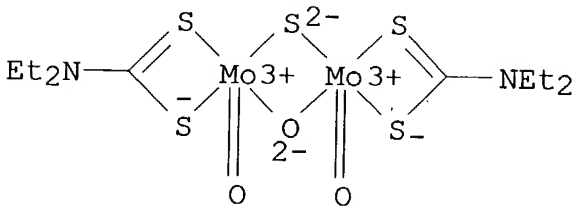


CM 2

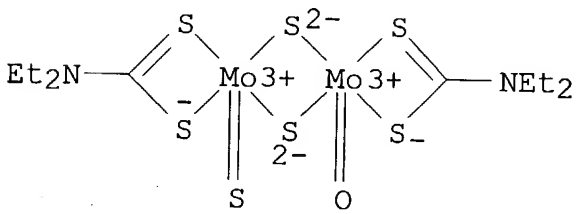
CRN 10549-76-5
CMF C16 H36 N



RN 63912-48-1 HCA
CN Molybdenum, bis(diethylcarbamodithioato-S,S')-.mu.-oxodioxo-.mu.-thioxodi-, stereoisomer (9CI) (CA INDEX NAME)

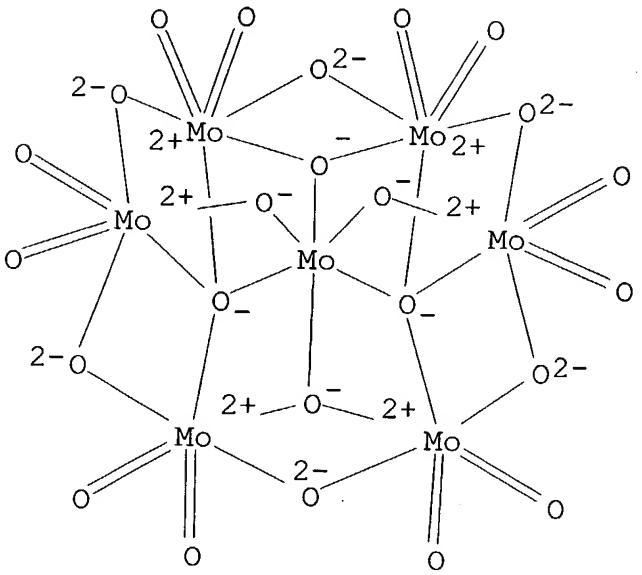


RN 66290-40-2 HCA
CN Molybdenum, bis(diethylcarbamodithioato-S,S')oxodi-.mu.-thioxothioxodi- (9CI) (CA INDEX NAME)



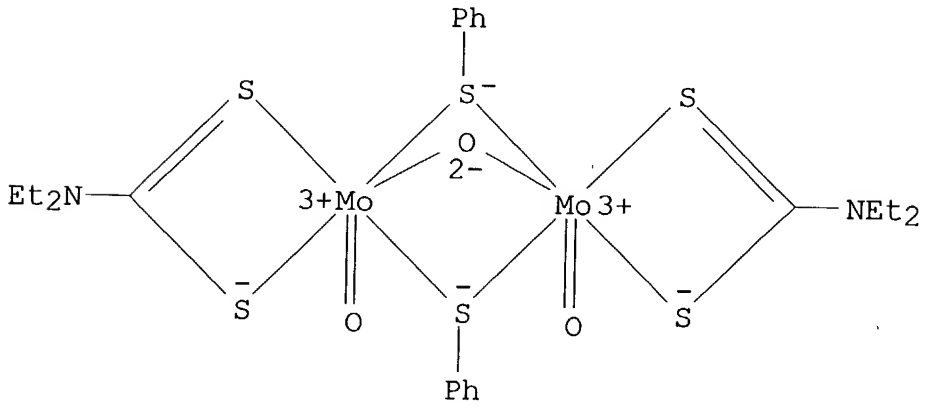
IT **12027-67-7**

(reaction of, with dipotassium 2,2-dicyanoethenedithioate)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)

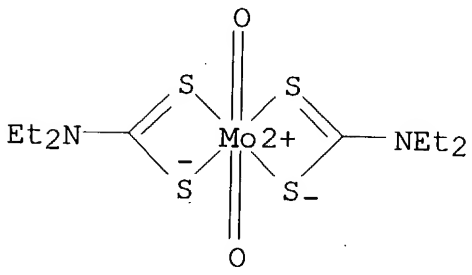


● 6 NH_4^+

IT **63016-34-2**
(reaction of, with **hydrogen sulfide**)
RN 63016-34-2 HCA
CN Molybdenum, bis[.mu.-(benzenethiolato)]bis(diethylcarbamodithioato-S,S')-.mu.-oxodioxodi-, stereoisomer (9CI) (CA INDEX NAME)



IT **19680-83-2**
(redn. of, by zinc dust in thiophenol soln.)
RN 19680-83-2 HCA
CN Molybdenum, bis(diethylcarbamodithioato-.kappa.S,.kappa.S')dioxo-, (OC-6-21)- (9CI) (CA INDEX NAME)



CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 72
IT **50860-31-6**
(electrochem. redn. of)
IT **36539-27-2P 55723-33-6P 59389-04-7P**
63912-48-1P 63912-56-1P 63912-57-2P **66290-40-2P**
66322-51-8P
(prepn. and electrochem. redn. of)
IT **12027-67-7**
(reaction of, with dipotassium 2,2-dicyanoethenedithioate)
IT **63016-34-2** 66290-39-9
(reaction of, with **hydrogen sulfide**)
IT **19680-83-2**
(redn. of, by zinc dust in thiophenol soln.)

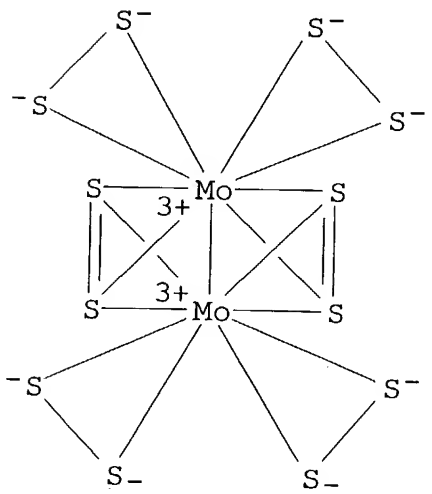
L27 ANSWER 19 OF 20 HCA COPYRIGHT 2004 ACS on STN
88:181663 [(S2)2Mo(S2)2Mo(S2)2]2-, a new complex with only disulfur(2-) ligands and a molybdenum-molybdenum bond. Mueller, Achim; Nolte, Wulf Otto; Krebs, Bernt (Fak. Chem., Univ. Bielefeld, Bielefeld, Fed. Rep. Ger.). Angewandte Chemie, 90(4), 286-7 (German) 1978. CODEN: ANCEAD. ISSN: 0044-8249.
AB An aq. ammoniacal soln. of (NH4)6Mo7O24.4H2O was satd. with **H2S** and then heated to redissolve the (NH4)2MoS4 ppt.; this red soln. was added to a satd. ammonium polysulfide soln. From the reaction mixt., stored in a closed vessel, a ppt. slowly formed from which long needles of (NH4)2[(S2)2Mo(S2)2Mo(S2)2].2H2O (I) were obtained. I was characterized by elementary anal., DTA, thermogravimetric, and magnetic measurements, ESCA and IR spectra, and crystal structure anal. I is orthorhombic, space group Pnna - D26h, with a 21.614, b 13.127, c 12.576 .ANG.; Z = 12. Both Mo(V) central atoms are in a distorted dodecahedral environment with 4 side-on disulfide groups surrounding each; with the Mo-Mo bond, each

Mo has a coordination no. 9.

IT **65878-95-7P**
(prepn. and crystal structure of)

RN 65878-95-7 HCA

CN Molybdate(2-), bis[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tetrakis(dithio)di-, (Mo-Mo), diammonium, dihydrate (9CI) (CA INDEX NAME)



●2 H_2O

●2 NH_4^+

IT **7783-06-4**, reactions
(reaction of, with ammonium heptamolybdate)

RN 7783-06-4 HCA

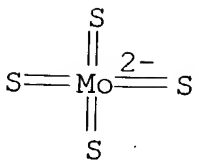
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

IT **15060-55-6**
(reaction of, with ammonium polysulfide)

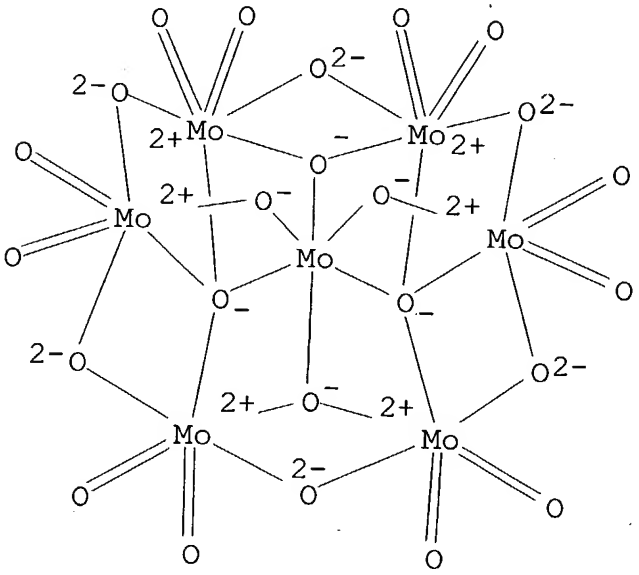
RN 15060-55-6 HCA

CN Molybdate(2-), tetrathioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

IT **12027-67-7**
(reaction of, with **hydrogen sulfide**)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



●6 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75
IT **65878-95-7P**
(prepn. and crystal structure of)
IT **7783-06-4**, reactions
(reaction of, with ammonium heptamolybdate)

IT **15060-55-6**
(reaction of, with ammonium polysulfide)
IT **12027-67-7**
(reaction of, with **hydrogen sulfide**)

L27 ANSWER 20 OF 20 HCA COPYRIGHT 2004 ACS on STN
79:99918 Spectrochemical study of oxythiopolymolybdates. Fridman, Ya. D.; Mikhailyuk, L. Ya.; Chalkov, G. I.; Tursunova, G. A. (Inst. Neorg. Fiz. Khim., Frunze, USSR). Zhurnal Neorganicheskoi Khimii, 18(7), 1836-42 (Russian) 1973. CODEN: ZNOKAQ. ISSN: 0044-457X.
AB From spectrophotometric studies, (NH4)2MoO2S2 (I) reacts in the presence of HCl at pH 4.35 to give (NH4)4H6[H2(MoO2S2)6]. In dil. HCl I forms H10[H2(MoO2S2)6] whereas in concd. HCl I decomps. to H2MoO4, MoS3, **H2S**, and NH4Cl. Equimolar amts. of I and (NH4)2MoS4 react to give (NH4)2MoOS3 which reacts with HCl at pH 5 to give (NH4)3H7[H2(MoOS3)6]; in concd. HCl, H10[H2(MoOS3)6] is formed. (NH4)2MoO3S, which is formed from I and (NH4)2MoO4, reacts with HCl to give H10[H2(Mo2O6S)6]. K3H7[H2(Mo2O5S2)6], isolated from the oxidn. reaction of I by iodine (equimolar amts. in the presence of KI or NH4I, forms H10[H2(Mo2O5S2)6] prior to neutralization with KOH. With an insufficient amt. of iodine, (NH4)6H4[H2(MoO2S2)3(MoO3S)3] is formed.
IT **39445-46-0 42711-40-0**
(ir spectrum of)
RN 39445-46-0 HCA
CN Molybdate(4-), pentaoxotrithioxodi-, diammonium dihydrogen (9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 42711-40-0 HCA
CN Ammonium molybdenum hydroxide sulfide ((NH4)Mo2(OH)S6), monohydrate (9CI) (CA INDEX NAME)

CM 1

CRN 167972-27-2
CMF H4 N . H O . Mo . S
CCI TIS

CM 2

CRN 14798-03-9
CMF H4 N

NH_4^+

CM 3

CRN 14280-30-9
CMF H O

OH^-

CM 4

CRN 7704-34-9
CMF S

S

CM 5

CRN 7439-98-7
CMF Mo

Mo

IT **42711-37-5P**
(prepn. of)
RN 42711-37-5 HCA
CN Ammonium molybdenum oxide sulfide ((NH4)2Mo3O4S6), hydrate (9CI) (CA INDEX NAME)

CM 1

CRN 167972-26-1
CMF H4 N . Mo . O . S
CCI TIS

CM 2

CRN 17778-80-2
CMF O

O

CM 3

CRN 14798-03-9
CMF H4 N

NH_4^+

CM 4

CRN 7704-34-9
CMF S

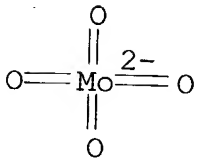
S

CM 5

CRN 7439-98-7
CMF Mo

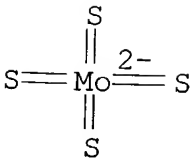
Mo

IT **13106-76-8 15060-55-6**
(reaction of, with diammonium dithiomolybdate)
RN 13106-76-8 HCA
CN Molybdate (MoO42-), diammonium, (T-4)- (9CI) (CA INDEX NAME)



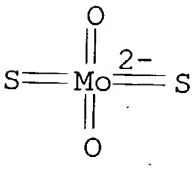
●2 NH_4^+

RN 15060-55-6 HCA
CN Molybdate(2-), tetrathioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



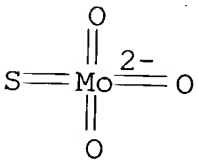
●2 NH_4^+

IT **16150-60-0 42711-38-6 42761-49-9**
(reaction of, with hydrochloric acid)
RN 16150-60-0 HCA
CN Molybdate(2-), dioxodithioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

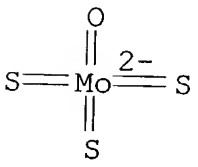
RN 42711-38-6 HCA
CN Molybdate(2-), trioxothioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

RN 42761-49-9 HCA

CN Molybdate(2-), oxotrithioxo-, diammonium, (T-4)- (9CI) (CA INDEX NAME)



●2 NH_4^+

CC 78-5 (Inorganic Chemicals and Reactions)
IT 39445-45-9 **39445-46-0** 42711-39-7 **42711-40-0**
42711-41-1
(ir spectrum of)
IT 39445-44-8P **42711-37-5P**
(prepn. of)
IT **13106-76-8 15060-55-6**
(reaction of, with diammonium dithiomolybdate)
IT **16150-60-0 42711-38-6 42761-49-9**
(reaction of, with hydrochloric acid)

=> d l28 1-20 cbib abs hitstr hitind

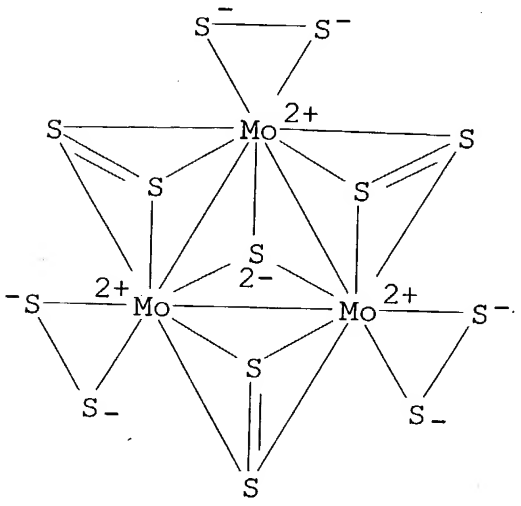
L28 ANSWER 1 OF 20 HCA COPYRIGHT 2004 ACS on STN
140:79566 Antifriction-antiwear additives consisting of trinuclear molybdenum-sulfur complexes containing little unreacted (labile) sulfur. John, Joby Varughese; Wangner, Ronald Paul; Gutierrez, Antonio; Giffin, Gregory Charles (Infineum International Limited, UK). Eur. Pat. Appl. EP 1382659 A1 20040121, 17 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK. (English). CODEN: EPXXDW. APPLICATION: EP 2003-253981 20030624. PRIORITY: EP 2002-78011 20020708.
AB Oil-sol. or oil-dispersible, preferably trinuclear, molybdenum-sulfur compds. as lubricating oil additives are synthesized by: (1) reacting the molybdenum compd. with a ligand source in a polar medium solvent, followed by (2) reacting a third compd. that can react with labile (i.e., **free** or **elemental**) **sulfur**, either with the reaction mixt. of step (1) after the reactants have begun reacting, or with the product of step (1). The molybdenum compd. in step (1) is preferably a trinuclear molybdenum compd. contg. .gtoreq.1 sulfur

atom. The product additives have a color reading of .ltoreq.5.5 (ASTM D 1500) (in white oil dispersion), contain 110 ppm Mo and 900 ppm Cl (ASTM D 6443), have a S-Mo wt. ratio of 1.45-2.25:1 (ASTM D 5185), and are more benign to metal corrosion.

IT **67031-31-6DP**, reaction products with dicoco alkyl amines (additives; antifriction-antiwear additives consisting of trinuclear molybdenum-sulfur complexes contg. little unreacted (labile) sulfur)

RN 67031-31-6 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)



●2 NH_4^+

IT **7704-34-9**, Sulfur, processes (labile; antifriction-antiwear additives consisting of trinuclear molybdenum-sulfur complexes contg. little unreacted (labile) sulfur)

RN 7704-34-9 HCA

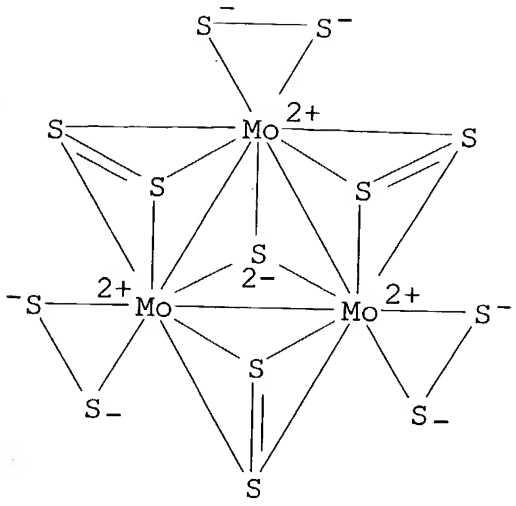
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

IC ICM C10M159-18
ICS C07F011-00; C10M125-04; C10M135-16; C10M135-18; C10M137-10; C10N010-12; C10N030-12; C10N030-20; C10N040-25; C10N070-00

CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
IT 594-07-0DP, Dithiocarbamic acid, N,N-dicoco alkyl derivs., reaction products with trinuclear molybdenum compds. 7439-98-7DP, Molybdenum, trinuclear compds., reaction products with coco alkyl derivs. of amines and dithiocarbamates **67031-31-6DP**, reaction products with dicoco alkyl amines
(additives; antifriction-antiwear additives consisting of trinuclear molybdenum-sulfur complexes contg. little unreacted (labile) sulfur)
IT **7704-34-9**, Sulfur, processes
(labile; antifriction-antiwear additives consisting of trinuclear molybdenum-sulfur complexes contg. little unreacted (labile) sulfur)

L28 ANSWER 2 OF 20 HCA COPYRIGHT 2004 ACS on STN
138:347827 Solid-state materials and clusters. Molybdenum and tungsten clusters as aqua ions [M3Q4(H2O)9]4+ (M = Mo, W; Q = S, Se) and related chalcogen-rich trinuclear clusters. Fedin, Vladimir P.; Sykes, A. Geoffrey; Kuppert, Dirk; Hegetschweiler, Kaspar; Appel-Colbus, Stephan; Beck, Horst Philipp (Institute of Inorganic Chemistry, Russian Academy of Sciences, Novosibirsk, 630090, Russia). Inorganic Syntheses, 33, 162-170 (English) 2002. CODEN: INSYA3. ISSN: 0073-8077. OTHER SOURCES: CASREACT 138:347827. Publisher: John Wiley & Sons, Inc..
AB The procedures for the prepn. of incomplete cuboidal Mo and W aqua chalcogen ions [M3Q4(H2O)9]4+ in different acids are described.
IT **383891-79-0P**
(for prepn. of trinuclear molybdenum chalcogenido aqua cluster ions in different acids)
RN 383891-79-0 HCA
CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium, dihydrate (9CI) (CA INDEX NAME)



●2 H_2O

●2 NH_4^+

IT **7704-34-9**, Sulfur, reactions
(reactant for prepn. of trinuclear molybdenum and tungsten chalcogenido aqua cluster ions in different acids)
RN 7704-34-9 HCA
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

CC 78-7 (Inorganic Chemicals and Reactions)
IT 37354-79-3P 37354-80-6P 127294-35-3P **383891-79-0P**
(for prepn. of trinuclear molybdenum chalcogenido aqua cluster ions in different acids)
IT **7704-34-9**, Sulfur, reactions 7782-49-2, Selenium, reactions 9080-17-5, Ammonium polysulfide
(reactant for prepn. of trinuclear molybdenum and tungsten chalcogenido aqua cluster ions in different acids)

L28 ANSWER 3 OF 20 HCA COPYRIGHT 2004 ACS on STN
135:291064 Lubricant compositions comprising organic molybdenum complexes. Mcconnachie, Jonathan Martin; Bell, Ian Alexander Weston; Brown, Alisdair James; Stiefel, Edward Ira; Hill, Ernestine W. (Infineum International Ltd., UK). Eur. Pat. Appl. EP 1138752 A1 20011004, 13 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO.

(English). CODEN: EPXXDW. APPLICATION: EP 2001-106336 20010315. PRIORITY: EP 2000-201137 20000329.

AB A lubricating oil compn. is provided comprising a major amt. of an oil of lubricating viscosity and a minor amt. of, as an additive, at least one compd. comprising a polynuclear molybdenum core and bonded thereto one or more anionic ligands capable of rendering the compd. oil-sol. or oil-dispersible, wherein the ratio of the no. of molybdenum atoms in the core to the no. of said ligands is 1:1, such as 3:2 or greater. ~.

IT **7704-34-9**, Sulfur, miscellaneous
(lubricant compns. comprising org. molybdenum complexes)

RN 7704-34-9 HCA

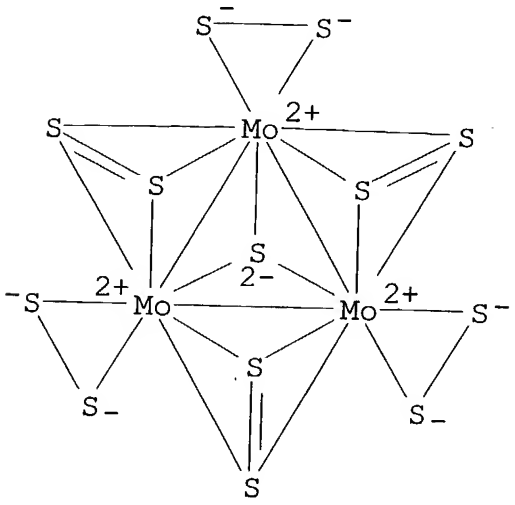
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

IT **67031-31-6**
(lubricant compns. comprising org. molybdenum complexes)

RN 67031-31-6 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)

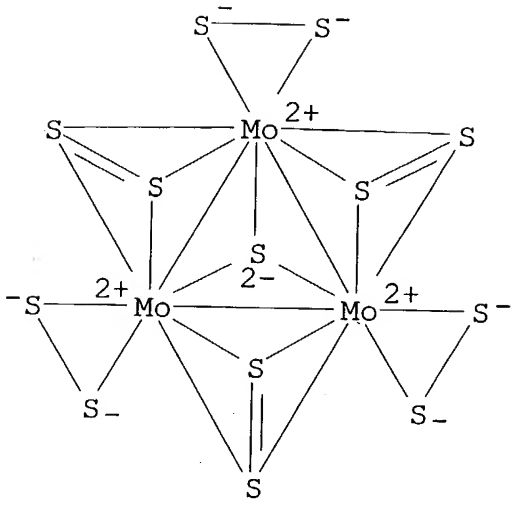


●2 NH_4^+

IC ICM C10M159-18
ICS C07F011-00

ICI C10N010-12, C10N030-06, C10N040-25
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
IT **7704-34-9**, Sulfur, miscellaneous
(lubricant compns. comprising org. molybdenum complexes)
IT 67-56-1, Methanol, reactions 75-15-0, Carbon disulfide, reactions 1120-48-5, Dioctylamine **67031-31-6**
(lubricant compns. comprising org. molybdenum complexes)

L28 ANSWER 4 OF 20 HCA COPYRIGHT 2004 ACS on STN
134:313320 Supported molybdenum-sulfur cluster compounds as precursors for HDS catalysts. Fedin, V. P.; Czyzniewska, J.; Prins, R.; Weber, T. (Laboratory for Technical Chemistry, Swiss Federal Institute of Technology (ETH), Zurich, 8092, Switz.). Applied Catalysis, A: General, 213(1), 123-132 (English) 2001. CODEN: ACAGE4. ISSN: 0926-860X. Publisher: Elsevier Science B.V..
AB The catalytic activity in the hydrodesulfurization (HDS) of thiophene at 370.degree.C was investigated on ex complex catalysts made from the ammonium and sodium, cobalt, and nickel salts of the [Mo3S13]2- cluster anion supported on .gamma.-Al2O3 or SiO2 and compared with that of a classic NiMo/Al2O3 catalyst. Samples were characterized by IR, Raman, UV/VIS, and thermogravimetric measurements. The samples were activated in He at 110 or 400.degree.C, and **H2S**/H2 (10% of **H2S** in H2) was introduced at room temp., 110 or 400.degree.C. Furthermore, the NiMo/Al2O3 catalyst was activated directly from room temp. to 400.degree.C in **H2S**/H2. The initial sulfidation temp. (400.degree.C or room temp.) did not influence the activity of the ex complex catalysts, whereas the classic NiMo/Al2O3 catalyst was very sensitive to the initial temp. of the sulfidation. The sample treated at 400.degree.C and sulfided starting at room temp. exhibited a much higher activity than the sample to which **H2S**/H2 was added at 400.degree.C. Thermal treatment of the catalyst in He at 110.degree.C as opposed to 400.degree.C led to a lower activity of the ex complex catalysts and to a higher activity of the NiMo/Al2O3 catalyst. Catalyst samples made from Na2[Mo3S13].cntdot.5H2O/Al2O3 were slightly less active than the samples obtained from (NH4)2[Mo3S13].cntdot.H2O/Al2O3.
IT **138952-15-5**
(supported molybdenum-sulfur cluster compds. as precursors for hydrodesulfurization catalysts)
RN 138952-15-5 HCA
CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium, monohydrate (9CI) (CA INDEX NAME)



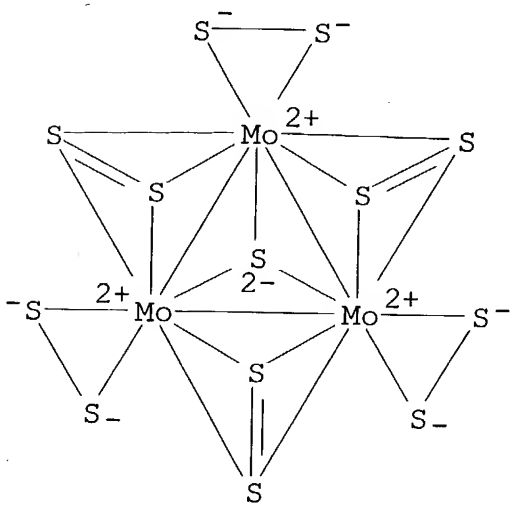
● H_2O

● 2 NH_4^+

CC 51-6 (Fossil Fuels, Derivatives, and Related Products)
IT **138952-15-5**
(supported molybdenum-sulfur cluster compds. as precursors for hydrodesulfurization catalysts)

L28 ANSWER 5 OF 20 HCA COPYRIGHT 2004 ACS on STN
130:354538 Direct liquefaction of Wyodak coal using molybdenum sulfides as well as vanadium and tungsten-vanadium phosphomolybdates as catalyst precursors. Van Woert, Howard C., Jr.; Givens, Edwin N.; Lafferty, C. J. (Center for Applied Energy Research, University of Kentucky, Lexington, KY, 40511-8410, USA). Preprints - American Chemical Society, Division of Petroleum Chemistry, 44(2), 202-205 (English) 1999. CODEN: ACPCAT. ISSN: 0569-3799. Publisher: American Chemical Society, Division of Petroleum Chemistry.
AB Direct liquefaction of Wyodak (subbituminous) coal using Mo catalysts was examd. at 440.degree. and 1000 psig , using as Mo precursors ammonium tetrathiomolybdate, ammonium dioxodithiomolybdate, (NH4)2Mo3S13.H2O, (NH4)2Mo2S12.2H2O, molybdovanadophosphoric acid, and tungstovanadophosphomolybdic acid. Coal conversions (both to THF-sol. material and conversions of residues) were all sensitive to the amt. of added **H2S** during liquefaction, suggesting that the presence of the sulfide source was necessary to form active Mo-S sites.
IT **138952-15-5**
(molybdenum source; molybdenum-catalyzed direct liquefaction of

Wyodak subbituminous coal with different molybdenum sources)
RN 138952-15-5 HCA
CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium, monohydrate (9CI) (CA INDEX NAME)



● H_2O

● 2 NH_4^+

IT **7783-06-4, Hydrogen sulfide,** uses
(sulfiding agent; molybdenum-catalyzed direct liquefaction of Wyodak subbituminous coal with different molybdenum sources)
RN 7783-06-4 HCA
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H_2S

CC 51-21 (Fossil Fuels, Derivatives, and Related Products)
IT 12293-21-9 15060-55-6, Diammonium tetrathiomolybdate 16150-60-0 65878-95-7 **138952-15-5**
(molybdenum source; molybdenum-catalyzed direct liquefaction of Wyodak subbituminous coal with different molybdenum sources)
IT **7783-06-4, Hydrogen sulfide,** uses
(sulfiding agent; molybdenum-catalyzed direct liquefaction of Wyodak subbituminous coal with different molybdenum sources)

L28 ANSWER 6 OF 20 HCA COPYRIGHT 2004 ACS on STN
124:104599 Hydrothermal synthesis of a novel Se12 ring in

[{(NH4)2[Mo3S11.72Se1.28]}[Se12]]. Stevens, Richard A.; Raymond, Casey C.; Dorhout, Peter K. (Dep. Chem., Colorado State Univ., Fort Collins, CO, 80523, USA). Angewandte Chemie, International Edition in English, 34(22), 2509-11 (English) 1995. CODEN: ACIEAY. ISSN: 0570-0833. Publisher: VCH.

AB The hydrothermal reaction of (NH4)2MoS4 with A2Sx (A = Na, K; x = 2-6) resulted in the formation of (NH4)2[Mo3S13] [monoclinic, space group Pm]. Replacing the polysulfide with A2Sex (A = Na, K; x = 2-4) gave Se, Mo and some sol. polychalcogenides. Na2S3Se3, prepd. from the elements, reacted with (NH4)2MoS4 to give [{(NH4)2[Mo3S11.72Se1.28]}[Se12]] (I). I crystals are trigonal, space group P.hivin.3c1, Z = 3, R= 0.0401, Rw = 0.0975. Double layers of trinuclear Mo clusters of [Mo3S11.72Se1.28]2- encircle D3d rings of Se12.

IT **7704-34-9**, Sulfur, reactions
(for prepn. of sodium selenide sulfide)

RN 7704-34-9 HCA

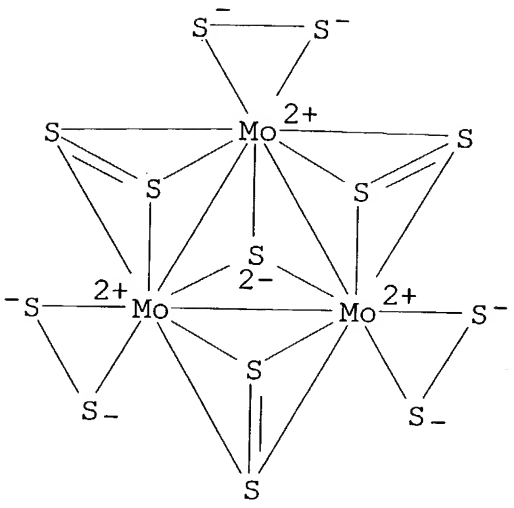
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

IT **67031-31-6P 172666-10-3DP**, solid soln. with selenoxomolybdate analog, preparation
(prepn. and crystal structure of)

RN 67031-31-6 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)

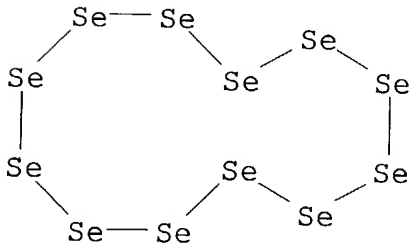


●2 NH_4^+

RN 172666-10-3 HCA
CN Molybdate(2-), tris[.mu.-(disulfur-S,S':S,S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium, compd. with mol. selenium (Se12) (1:1) (9CI) (CA INDEX NAME)

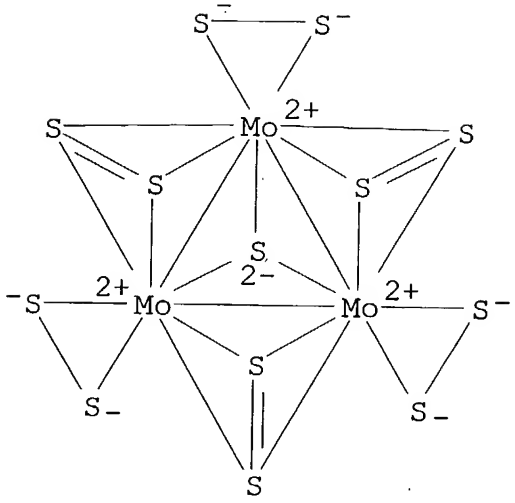
CM 1

CRN 78112-19-3
CMF Se12



CM 2

CRN 67031-31-6
CMF H4 N . 1/2 Mo3 S13
CCI CCS



●2 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75

IT 7440-23-5, Sodium, reactions **7704-34-9**, Sulfur, reactions 7782-49-2, Selenium, reactions
(for prepn. of sodium selenide sulfide)

IT **67031-31-6P** 172666-08-9DP, solid soln. with thioxomolybdate analog, preparation **172666-10-3DP**, solid soln. with selenoxomolybdate analog, preparation
(prepn. and crystal structure of)

L28 ANSWER 7 OF 20 HCA COPYRIGHT 2004 ACS on STN

124:61002 Sulfidation study of molybdenum oxide using MoO3/SiO2/Si(100) model catalysts and Mo3IV-sulfur cluster compounds. Muijsers, J. C.; Weber, Th.; van Hardeveld, R. M.; Zandbergen, H. W.; Niemantsverdriet, J. W. (Schuit Institute Catalysis, Eindhoven University Technology, Eindhoven, 5600 MB, Neth.). Journal of Catalysis, 157(2), 698-705 (English) 1995. CODEN: JCTLA5. ISSN: 0021-9517. Publisher: Academic.

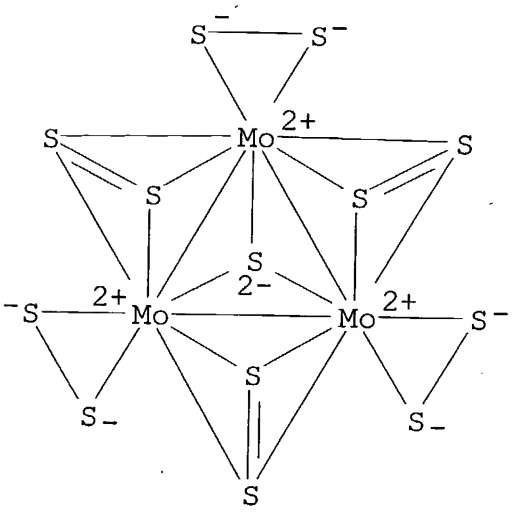
AB Monochromatic XPS spectra of the temp.-dependent sulfidation of MoO3/SiO2/Si(100) model catalysts were compared with spectra of model Mo-S cluster compds., esp. with those of (NH4)2[Mo3S13].cntdot.H2O and its thermal decompn. products. XPS was used to identify different states of sulfur and molybdenum occurring during sulfidation. The spectra showed the presence of bridging disulfide ligands and of substantial amts. of MoV in an

early stage of the sulfidation. These findings suggest that the initial reaction of the MoO3-type precursor with the **H2S** /H2 atmosphere consists of two elementary steps, namely, an O-S exchange followed by a Mo-S redox process.

IT **138952-15-5**
(ref. compd.; mechanism of and cluster formation in sulfidation of Mo-contg. compds. as ref. hydrodesulfurization catalysts)

RN 138952-15-5 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium, monohydrate (9CI) (CA INDEX NAME)



● H_2O

● 2 NH_4^+

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 29, 67, 78

IT 1313-27-5, Molybdenum trioxide, uses 97278-54-1 129771-07-9 **138952-15-5**
(ref. compd.; mechanism of and cluster formation in sulfidation of Mo-contg. compds. as ref. hydrodesulfurization catalysts)

L28 ANSWER 8 OF 20 HCA COPYRIGHT 2004 ACS on STN

119:151081 Molybdenum(IV) sulfide-disulfide complex ([MoIV3S(S2)6]2-) from amorphous molybdenum trisulfide by the reaction with hydroxide and R = 0.015 structure of (NH4)2[MoIV3S(S2)6].H2O. Mueller, A.; Diemann, E.; Krickemeyer, E.; Walberg, H. J.; Boegge, H.; Armatage, A. (Fak. Chem., Univ. Bielefeld, Bielefeld, D-W-4800/1, Germany). European Journal of Solid State and Inorganic Chemistry, 30(5),

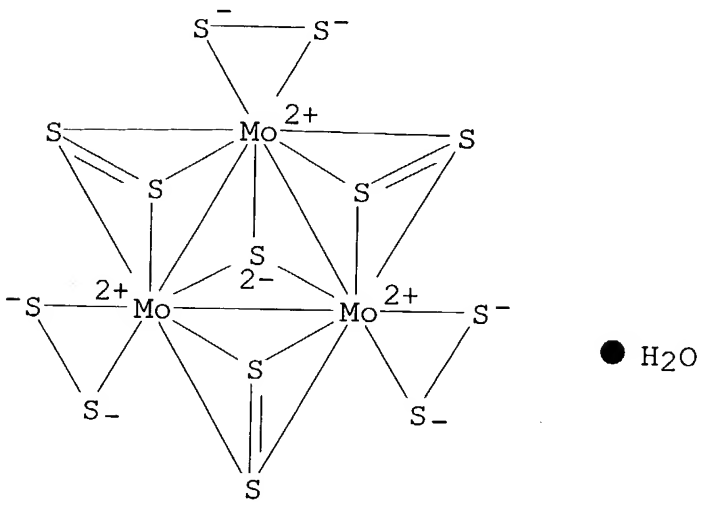
565-72 (English) 1993. CODEN: EJSCE5. ISSN: 0992-4361.

AB A refined crystal structure detn. (R = 0.015) of (NH4)2[Mo3S13].H2O including H-atom positions of the NH4+ ions is reported. The formation of the cluster anion [Mo3S13]2- from amorphous MoS3, suspended in O2-free aq. NH3 soln. at room temp., is described. This observation is discussed in terms of triangular sulfide and disulfide bridged Mo3 units regarded as structural features in the amorphous educt.

IT **138952-15-5P**
(prepn. and crystal structure of)

RN 138952-15-5 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium, monohydrate (9CI) (CA INDEX NAME)



CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75

IT **138952-15-5P**
(prepn. and crystal structure of)

L28 ANSWER 9 OF 20 HCA COPYRIGHT 2004 ACS on STN

117:61622 Reactivity of triangular M3Z74+ (M = molybdenum, tungsten; Z = sulfur, selenium) complexes and x-ray structural study (NH4)2W3(.mu.3-S)(.mu.2-S)3(S4)3(NH3)3.H2O. Fedin, V. P.; Sokolov, M. N.; Kibirev, O. S.; Virovets, A. V.; Podberezskaya, N. V.; Fedorov, V. E. (Inst. Neorg. Khim., Novosibirsk, USSR). Zhurnal

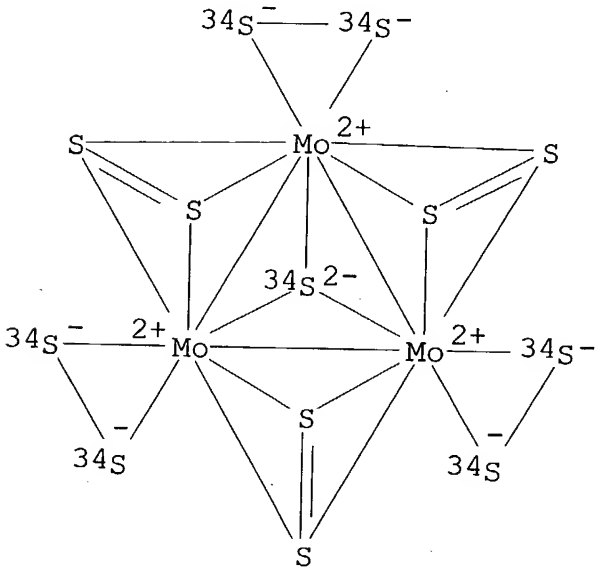
Neorganicheskoi Khimii, 36(12), 3089-95 (Russian) 1991. CODEN: ZNOKAQ. ISSN: 0044-457X.

AB During the reaction of (Et4N)2Mo3S7Br2 (I) with (NH4)2Sx, satd. with S, and with Cp2TiS5 (Cp = cyclopentadienyl), the Mo3S74+ core is retained to give [Mo3S7(S2)3]2-. I reacted with NaS2CNEt2 to give Mo3S7(S2CNEt2)4. The reaction of (Et4N)2Mo3Se7Br6 with KSCN gave (Et4N)2Mo3Se7(NCS)6. W3Se7Br4 reacted with (NH4)2Sx to give (NH4)2W3S16(NH3)3.H2O (II) and with KSCN to give (Et4N)2W3S4(NCS)9. Mo3Se7Br4 reacted with (NH4)2Sx in H2O at 150.degree. to give (NH4)2Mo3S13 and subsequently (Et4N)2Mo3S7Br6 after treatment with Et4NBr. Thermolysis of II gave (Et4N)2W2S2(.mu.-S)2(S4)2. II is trigonal, space group P3/c, a 12.425(2), c 10.109(1) .ANG., Z = 2, R = 0.059, Rf = 0.0649. The W3 triangular cluster anion in II has 1 .mu.3-S atom, 3 .mu.3-S atoms, and 4 S42- moieties each coordinated bidentately to 1 W atom. An NH3 ligand is on each W atom.

IT **139594-43-7P**
(prepn. of)

RN 139594-43-7 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio-34S2)-.mu.3-thioxo-34S-tri-, triangulo, diammonium (9CI) (CA INDEX NAME)



●2 NH_4^+

CC 78-9 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75

IT 147-84-2DP, molybdenum complex with diethyldithiocarbamic acid 7439-98-7DP, Molybdenum, complex 131836-26-5P 139353-16-5P 139383-09-8P **139594-43-7P**
(prepn. of)

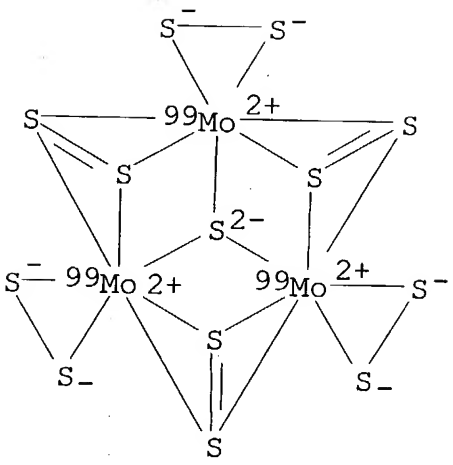
L28 ANSWER 10 OF 20 HCA COPYRIGHT 2004 ACS on STN
116:206642 Nuclear quadrupole interaction of molybdenum-99(.beta.-)technetium-99 in various molybdenum sulfur cluster compounds and thermal decomposition products of ((NH4)2[Mo3S(S2)6].nH2O (n = 0-2)). Mottner, P.; Lerf, A.; Butz, T.; Knoezinger, H.; Mueller, A.; Wittneben, V.; Krickemeyer, E. (Walther-Meissner-Inst. Tieftemperaturforsch., Bayer. Akad. Wiss., Garching, W-8046, Germany). Chemical Physics, 160(2), 327-39 (English) 1992. CODEN: CMPHC2. ISSN: 0301-0104.

AB The nuclear quadrupole interaction (NQI) of 99Mo(.beta.-)99Tc was measured by time differential perturbed angular correlations in the following Mo-S-cluster compds. and ions: (NH4)2[MoIV3S(S2)6].nH2O (n = 0-2), [MoIV3SS3(CN)9]5-. (NH4)2[MoV2(S2)6].2H2O, and [MoIII2S2(CN)8]6-. All compds. exhibit low NQIs with the exception of (NH4)2[MoIV3S(S2)6].nH2O which shows in addn. to the low NQI a large fraction of a high NQI, possibly a consequence of the nuclear transmutation. The thermal decompn. products of the [Mo3S(S2)6]2- cluster towards MoS2.15, which may serve as a model for tech. hydrodesulfurization catalysts, were studied.

IT **140684-11-3P**
(prepn. and nuclear quadrupole interactions and thermal decompn. and reaction of, with potassium cyanide)

RN 140684-11-3 HCA

CN Molybdate(2-)-99Mo, tris[.mu.-(disulfur-S,S':S,S')]tris(dithio)-.mu.3-thioxotri-, diammonium, hydrate (9CI) (CA INDEX NAME)



● x H_2O

● 2 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 70

IT **140684-11-3P**
(prepn. and nuclear quadrupole interactions and thermal decompn. and reaction of, with potassium cyanide)

L28 ANSWER 11 OF 20 HCA COPYRIGHT 2004 ACS on STN

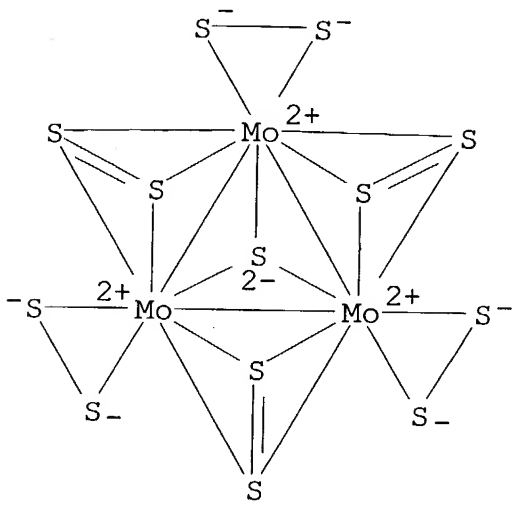
116:98146 Studies on the triangular [molybdate-disulfido-sulfido] cluster [Mo3S13]2-: electronic structure (X.alpha. calculations, XPS), crystal structure of (Ph4As)2[Mo3S13].2CH3CN and a refinement of the crystal structure of (NH4)2[Mo3S13].H2O. Mueller, A.; Wittneben, V.; Krickemeyer, E.; Boegge, H.; Lemke, M. (Fak. Chem., Univ. Bielefeld, Bielefeld, W-4800/1, Germany). Zeitschrift fuer Anorganische und Allgemeine Chemie, 605, 175-88 (English) 1991. CODEN: ZAACAB. ISSN: 0044-2313.

AB The electronic structure of the triangular thio cluster [Mo3S13]2- has been studied by electronic absorption and XPS and is discussed in terms of SCF-X.alpha.-SW calcns. The synthesis and crystal structure of (Ph4As)2[Mo3S13].2CH3CN (I), which is sol. in org. solvents, are reported together with a refinement of the crystal structure of (NH4)2[Mo3S13].H2O (II). Crystal data: I, triclinic, space group P.hivin.1, Z = 2, R/Rw = 0.078/0.082; II, monoclinic, space group Cm, Z = 2, R/Rw = 0.038/0.045.

IT **138766-18-4P**
(prepn. and crystal structure and XPS of)

RN 138766-18-4 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-S,S':S,S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium, hydrate (2:1) (9CI) (CA INDEX NAME)



● 1/2 H_2O

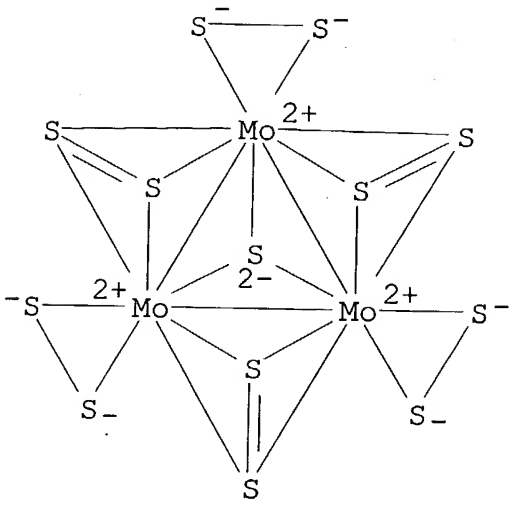
● 2 NH_4^+

IT **138952-15-5P**

(prepn. and crystal structure and cation exchange and XPS of)

RN 138952-15-5 HCA

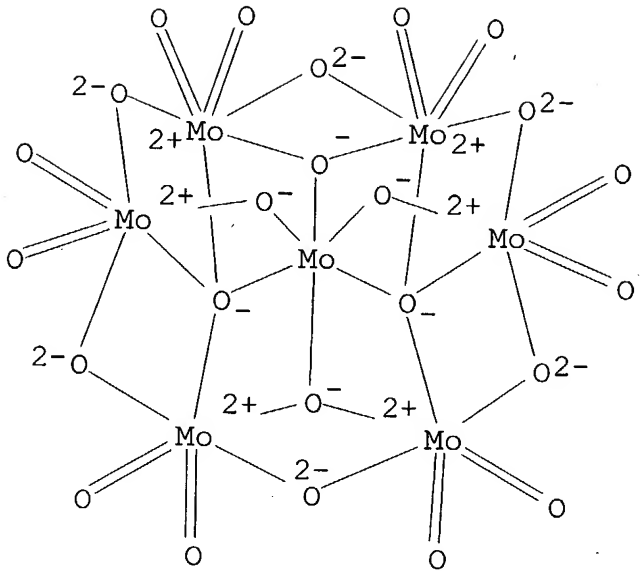
CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium, monohydrate (9CI) (CA INDEX NAME)



● H_2O

●2 NH_4^+

IT **12027-67-7**
(reaction of, with polysulfide)
RN 12027-67-7 HCA
CN Molybdate (Mo7O246-), hexaammonium (9CI) (CA INDEX NAME)



●6 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 73, 75
IT 103601-59-8P **138766-18-4P**
(prepn. and crystal structure and XPS of)
IT **138952-15-5P**
(prepn. and crystal structure and cation exchange and XPS of)
IT **12027-67-7**
(reaction of, with polysulfide)

L28 ANSWER 12 OF 20 HCA COPYRIGHT 2004 ACS on STN
115:246596 Preparation of complexes containing the [Mo3S(S2)3]4+ core and structure of tris(diethyldithiocarbamato)tris(.mu.-disulfido)(.mu.3-thio)-triangulo-trimolybdenum(IV) iodide.
Zimmermann, Heinrich; Hegetschweiler, Kaspar; Keller, Thomas; Gramlich, Volker; Schmalle, Helmut W.; Petter, Walter; Schneider, Walter (Lab. Anorg. Chem., ETH-Zent., Zurich, CH-8092, Switz.).
Inorganic Chemistry, 30(23), 4336-41 (English) 1991. CODEN: INOCAJ.
ISSN: 0020-1669.
AB [Mo3S(S2)3(dtc)3]I, [Mo3S(S2)3(tpy)3]I, and [Mo3S(S2)3(tpy)2(dtc)]I (Hdtc = diethyldithiocarbamic acid, Htpy = 2-thiopyridine) were prepd. by the oxidn. of the terminal disulfido groups of [Mo3S(S2)6]2- with disulfides. The influence of the redox potential of the oxidant on the reaction rate is discussed.

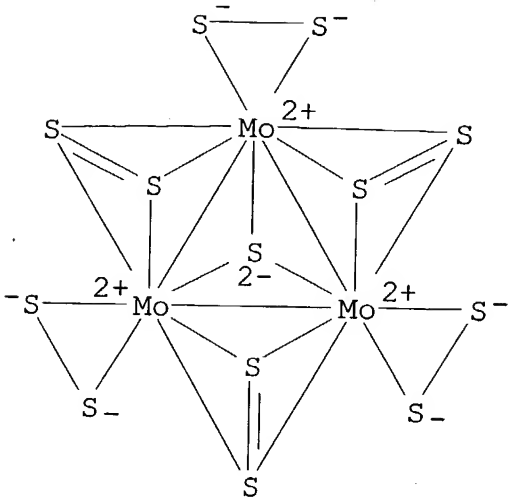
[Mo3S(S2)3(oxq)3]Br (Hoxq = 8-hydroxyquinoline), (PPh4)2[Mo3S(S2)3(cat)3] (H2cat = o-catechol) and [Mo3S(S2)3(dtc)3]X (X = I, Br) were obtained by the substitution of Br in [Mo3S(S2)3Br6]2-. Two types of crystals of the polymorphous [Mo3S(S2)3(dtc)3]I have been analyzed by x-ray diffraction, modification 1 with space group Aba2, Z = 8, a 24.92(1), b 17.93(1), c 16.56(1) .ANG. and modification 2 with space group Iba2, Z = 8, a 17.761(3), b 24.281(4), and c 16.74(1) .ANG.. In both crystals, a weak binding of I to the 3 axial S atoms of the complex was found, with av. distance I-S = 3.30 (modification 1) and 3.25 .ANG. (modification 2). According to similar structures described in literature, a general anionic binding site of [Mo3S(S2)3] is postulated. In the FAB mass spectrum of [Mo3S(S2)3(tpy)2(dtc)] a redistribution of ligands was indicated by the signals of [Mo3S(S2)3(tpy)x(dtc)y] (3 .gtoreq. x .gtoreq. 1,2 .gtoreq. y .gtoreq. 0). On the other hand, no dissocn. of dtc has been detected in solns. of [Mo3S7(dtc)3]I at room temp. by NMR spectroscopy. However, the signals of the free Hoxq and H2cat, as obsd. in the 1H NMR spectrum of [Mo3S7(oxq)3]+ and [Mo3S7(cat)3]2-, indicated more labile Mo-N and Mo-O bonds compared to the Mo-S bond in the dtc complex.

IT **67031-31-6P**

(prepn. and oxidn. of, by dithiocarbamate or thiopyridine)

RN 67031-31-6 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)



●2 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
IT **67031-31-6P**
(prepn. and oxidn. of, by dithiocarbamate or thiopyridine)

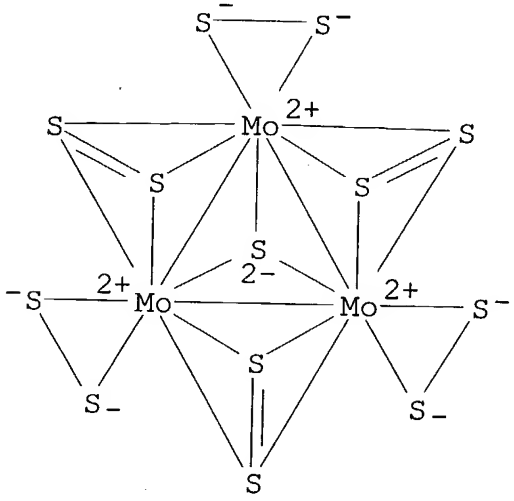
L28 ANSWER 13 OF 20 HCA COPYRIGHT 2004 ACS on STN
113:16894 Triangular thio complexes of molybdenum: reactions with halogens, hydrohalogen acids and phosphines. Fedin, V. P.; Sokolov, M. N.; Mironov, Yu. V.; Kolesov, B. A.; Tkachev, S. V.; Fedorov, V. E. (Inst. Inorg. Chem., Novosibirsk, 630090, USSR). Inorganica Chimica Acta, 167(1), 39-45 (English) 1990. CODEN: ICHAA3. ISSN: 0020-1693.

AB Triangular (NH4)2Mo3S13.2H2O interacts with Cl2 and Br2 in CH3CN and with HX (X = Cl, Br and I) retaining its Mo3(.mu.3-S)(.mu.2-S2)34+ cluster fragment to produce the Mo3(.mu.3-S)(.mu.2-S2)3X62- complexes in high yields. IR and Raman spectra of the Mo3S7X62- complexes have been studied. Salts of Mo3S7X62- (X = Cl, Br) contg. 92Mo, 100Mo and 34S isotopes and compds. with .mu.2-(32S-34S) ligands have been synthesized also. For Mo3S7Cl62-, an anal. of the normal vibrations has been performed. Mo3S7X62- (X = Cl, Br) interact with phosphines (PPh3 and dppe). The reactions proceed with elimination of the .mu.2-S2 S atoms to form phosphine sulfides and Mo3S4X4.3PPh3 and Mo3S4X4.3dppe contg. a Mo3S44+ cluster fragment. For the reaction of Mo3(.mu.3-34S)(.mu.2-32Se-34Sa)3Cl62- with PPh3, that it is the equatorial .mu.2-S2 S atoms that are predominantly eliminated.

IT **13965-97-4**, Sulfur-34, properties
(isotope effect of, on vibrational spectra of molybdenum chloro sulfido trinuclear clusters)
RN 13965-97-4 HCA
CN Sulfur, isotope of mass 34 (8CI, 9CI) (CA INDEX NAME)

^{34}S

IT **67031-31-6**
(reaction of, with halides and hydrohalic acids with and without ammonium or phosphonium halides)
RN 67031-31-6 HCA
CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)



● 2 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 73
IT **13965-97-4**, Sulfur-34, properties 14191-67-4, Molybdenum-92, properties 14392-21-3, Molybdenum-100, properties
(isotope effect of, on vibrational spectra of molybdenum chloro sulfido trinuclear clusters)
IT **67031-31-6**
(reaction of, with halides and hydrohalic acids with and without ammonium or phosphonium halides)

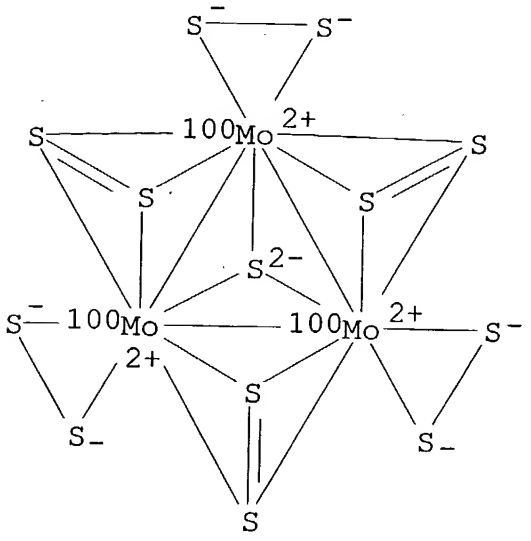
L28 ANSWER 14 OF 20 HCA COPYRIGHT 2004 ACS on STN
112:228559 Synthesis and vibrational (IR and Raman) spectroscopic study of triangular thio complexes [Mo3S13]2- containing molybdenum-92, molybdenum-100 and sulfur-34. Fedin, V. P.; Kolesov, B. A.; Mironov, Yu. V.; Fedorov, V. Ye. (Inst. Inorg. Chem., Novosibirsk, 630090, USSR). Polyhedron, 8(20), 2419-23 (English) 1989. CODEN: PLYHDE. ISSN: 0277-5387.

AB Triangular [Mo3S13]2- was obtained by the reaction of triangular Mo3S7Br4 with an aq. soln. of S2-x. Starting from compds. contg. 92Mo, 100Mo and 34S isotopes, the following thio-complexes have been obtained: [92Mo3S13]2-, [100Mo3S13]2-, [Mo334S13]2-, [Mo3(.mu.3-S)(.mu.2-S34S)3(34S2)3]2- and [Mo3(.mu.3-34SS)3(S2)3]2-. Along with the nucleophilic substitution of the Br ligands by the terminal S2 ligands, elimination-addn. of S in .mu.2-S2 ligands also takes place. This allows prepn. of thio-complexes contg. .mu.2-34S32S ligands. IR and Raman spectra of the thio-complexes have been studied, normal vibrations have been calcd. and the bond force consts. detd.

IT **127161-24-4P**
(prepn. and force const. and vibrational spectra of)

RN 127161-24-4 HCA

CN Molybdate(2-)-100Mo, tris[.mu.-(disulfur-S,S':S,S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium, dihydrate (9CI) (CA INDEX NAME)



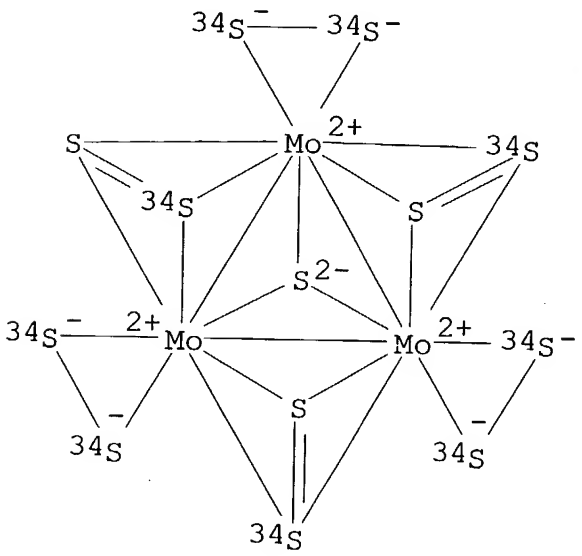
● 2 H_2O

● 2 NH_4^+

IT **127161-22-2P 127161-23-3P 127211-93-2P 127277-35-4P**
(prepn. and force consts. and vibrational spectra of)

RN 127161-22-2 HCA

CN Molybdate(2-), tris[.mu.-[(disulfur-34S)-S,S':S,S']]tris(dithio-34S2)-.mu.3-thioxotri-, triangulo, diammonium, dihydrate (9CI) (CA INDEX NAME)

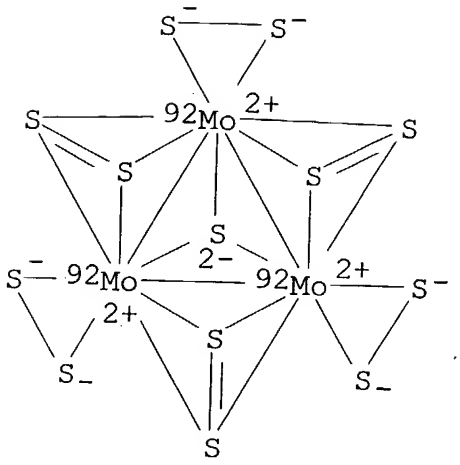


● 2 H_2O

● 2 NH_4^+

RN 127161-23-3 HCA

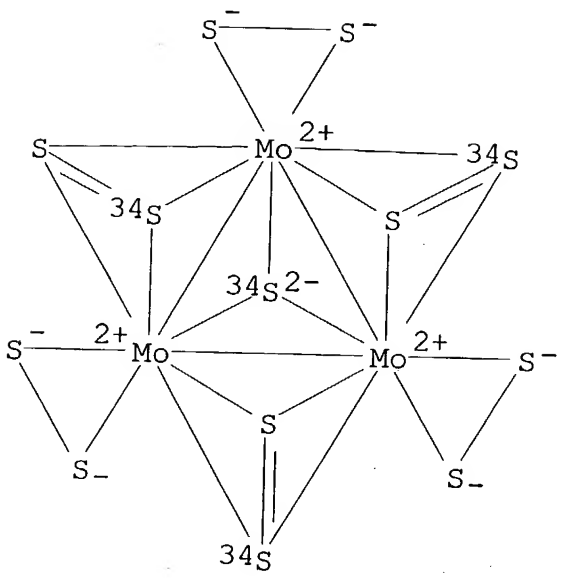
CN Molybdate(2-)-92Mo, tris[.mu.-(disulfur-S,S':S,S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium, dihydrate (9CI) (CA INDEX NAME)



● 2 H_2O

● 2 NH_4^+

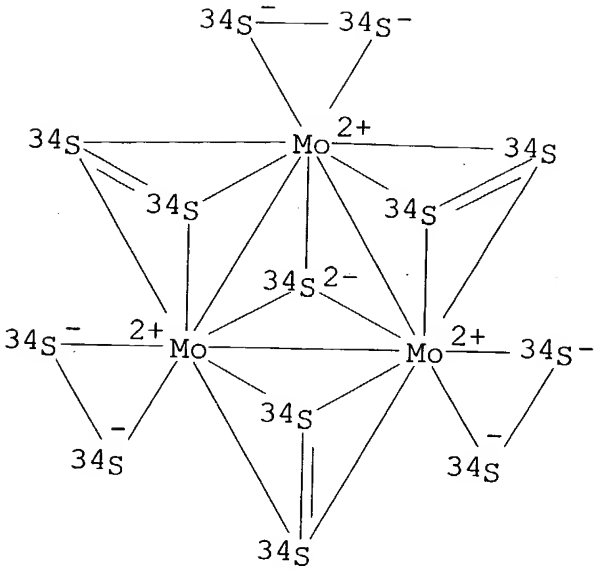
RN 127211-93-2 HCA
CN Molybdate(2-), tris[.mu.-[(disulfur-34S)-S,S':S,S']]tris(dithio)-.mu.3-thioxo-34S-tri-, triangulo, diammonium, dihydrate (9CI) (CA INDEX NAME)



● 2 H_2O

● 2 NH_4^+

RN 127277-35-4 HCA
CN Molybdate(2-), tris[.mu.-[(disulfur-34S2)-S,S':S,S]]tris(dithio-34S2)-.mu.3-thioxo-34S-tri-, triangulo, diammonium, dihydrate (9CI) (CA INDEX NAME)



●2 H_2O

●2 NH_4^+

IT **13965-97-4**, Sulfur-34, reactions
(redn. of, by sodium borohydride)
RN 13965-97-4 HCA
CN Sulfur, isotope of mass 34 (8CI, 9CI) (CA INDEX NAME)

^{34}S

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 73
IT **127161-24-4P**
(prepn. and force const. and vibrational spectra of)
IT **127161-22-2P 127161-23-3P 127211-93-2P**
127277-35-4P
(prepn. and force consts. and vibrational spectra of)
IT **13965-97-4**, Sulfur-34, reactions
(redn. of, by sodium borohydride)

L28 ANSWER 15 OF 20 HCA COPYRIGHT 2004 ACS on STN
110:87381 Reaction of molybdenum chalcogenide halide and halide cluster compounds with ammonium polysulfide. Fedin, V. P.; Geras'ko, O. A.; Mironov, Yu. V.; Fedorov, V. E. (Inst. Neorg. Khim., Novosibirsk, USSR). Zhurnal Neorganicheskoi Khimii, 33(11), 2846-9 (Russian)

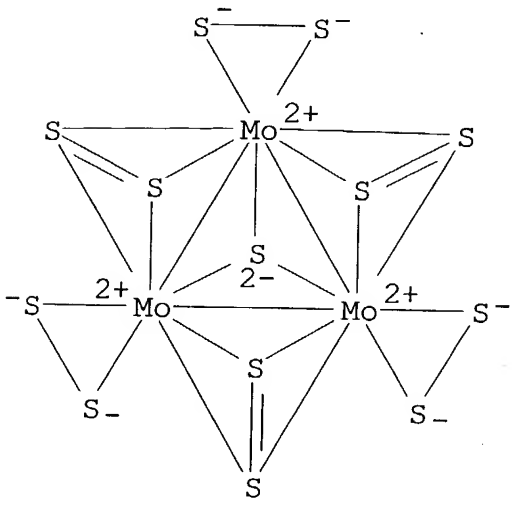
1988. CODEN: ZNOKAQ. ISSN: 0044-457X.

AB The reactions of MoS2Cl3, MoS2Cl2, K4Mo2Cl8 and Mo3S7Br4 with (NH4)2Sx gave (NH4)2(Mo2S12).2H2O and (NH4)2(Mo3S13).2H2O, the yields of which depended on the reaction temp. Mo3Se7Cl4 reacted with (NH4)2Sx to give (NH4)2(Mo3Se7S6).2H2O.

IT **67031-31-6P**
(prepn. of, from molybdenum chloro disulfido polynuclear complexes and ammonium polysulfide)

RN 67031-31-6 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)



●2 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)

IT **67031-31-6P** 68417-00-5P
(prepn. of, from molybdenum chloro disulfido polynuclear complexes and ammonium polysulfide)

L28 ANSWER 16 OF 20 HCA COPYRIGHT 2004 ACS on STN

105:163795 Coordination chemistry of molybdenum- and tungsten-sulfur compounds and some aspects of hydrodesulfurization catalysis. Mueller, A. (Fac. Chem., Univ. Bielefeld, Bielefeld, 4800, Fed. Rep. Ger.). Polyhedron, 5(1-2), 323-40 (English) 1986. CODEN: PLYHDE. ISSN: 0277-5387.

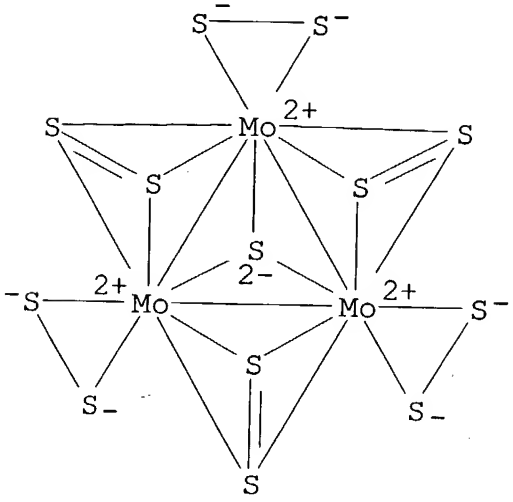
AB A survey and a presentation of new results on the coordination chem. of Mo- and W-S compds. are presented. Included is a systematic

treatment of the compd. types with different functional groups and the different reaction types. Mol. models for cryst. MoS2 and the nitrosylatred CoMoS phase as well as for the promoting effect of the Co atoms on hydrodesulfurization catalysis are also discussed.

IT **67031-31-6P**
(prepn. and reaction of, with tetraphenylarsonium chloride)

RN 67031-31-6 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)

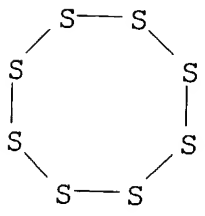


●2 NH_4^+

IT **10544-50-0**, reactions
(reaction of, with tetrathiomolybdate)

RN 10544-50-0 HCA

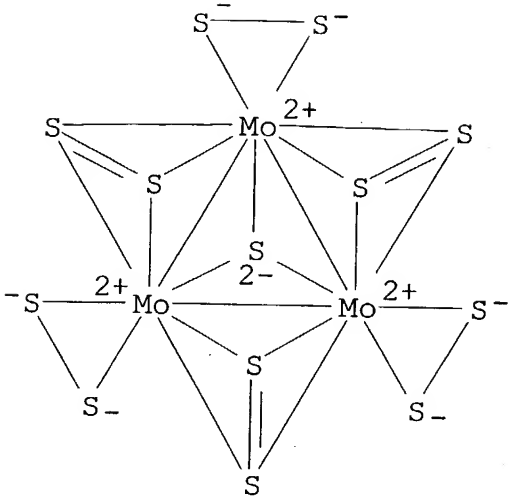
CN Sulfur, mol. (S8) (7CI, 8CI, 9CI) (CA INDEX NAME)



CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 67, 75

IT **67031-31-6P**
(prepn. and reaction of, with tetraphenylarsonium chloride)
IT **10544-50-0**, reactions
(reaction of, with tetrathiomolybdate)

L28 ANSWER 17 OF 20 HCA COPYRIGHT 2004 ACS on STN
100:166958 Synthesis, structure, and reactivity of the tetraethylammonium molybdate cluster [(C2H5)4N]2[Mo3(.mu.3-S)(.mu.2-S)3(SCH2CH2S)3]: a cluster with sulfur "vacancies" and resonance Raman spectral similarity to iron sulfide (Fe3S4) proteins.
Halbert, T. R.; McGauley, K.; Pan, W. H.; Czernuszewicz, R. S.; Stiefel, E. I. (Corp. Res.-Sci. Lab., Exxon Res. Eng. Co., Linden, NJ, 07036, USA). Journal of the American Chemical Society, 106(6), 1849-51 (English) 1984. CODEN: JACSAT. ISSN: 0002-7863.
AB Solid (NH4)2[Mo3S(S2)6] and dry Et4NBr react with excess (>9 equivs.) Na2[SCH2CH2S] in CH3CN at room temp. for form [Et4N]2[Mo3S4(SCH2CH2S)3] (I) in good yield. Crystals of I form in space group P21/n with a 13.694(4), b 13.654(4), c 20.013(4) .ANG., V = 3664(2) .ANG.3, Z = 4, and Rwf = 0.047. The Mo3S4(SCH2CH2S)32- anion contains an equilateral triangle of Mo(IV) atoms (Mo-Mo 2.77-2.79 .ANG.), 1 capping .mu.3-sulfido ligand and 3 bridging .mu.2-sulfido ligands. Each Mo ion is also coordinated by a single -SCH2CH2S- chelating ligand. The arrangement of the S and Mo atoms in layers is related to the arrangement obsd. in solid MoS2. Solns. of I in CH3CN react with stoichiometric amts. of S8 or C6H5CH2SSSCH2C6H5 to form [N(C2H5)4]2[Mo3S7(SCH2CH2S)2] (II). Addn. of CN- or PPh3 to II regenerates I. This interconversion mimics the creation and filling of S vacancies often proposed as active sites on heterogeneous MoS2 based hydrotreating catalysts. Finally, the resonance Raman spectrum of I shows a remarkable resemblance to the spectra of 3-Fe centers in certain Fe/S proteins, suggesting a possible structural analogy.
IT **67031-31-6**
(reaction of, with disodium ethanedithiolate in presence of tetraethylammonium bromide)
RN 67031-31-6 HCA
CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)



●2 NH_4^+

IT **7704-34-9**, reactions
(reactions of, with trimolybdenum sulfide ethanedithiolate or trimolybdenum sulfide disulfide ethanedithiolate cluster)
RN 7704-34-9 HCA
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75
IT **67031-31-6**
(reaction of, with disodium ethanedithiolate in presence of tetraethylammonium bromide)
IT **7704-34-9**, reactions
(reactions of, with trimolybdenum sulfide ethanedithiolate or trimolybdenum sulfide disulfide ethanedithiolate cluster)

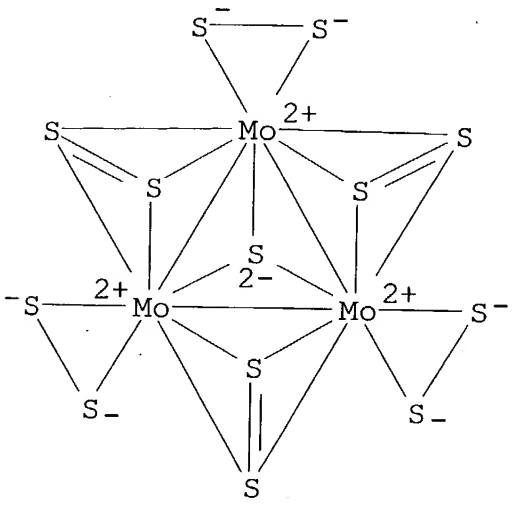
L28 ANSWER 18 OF 20 HCA COPYRIGHT 2004 ACS on STN
93:124935 Novel sulfur-rich molybdenum compounds. Mueller, A.; Bhattacharyya, R. G.; Eltzner, W.; Mohan, N.; Neumann, A.; Sarkar, S. (Fac. Chem., Uni. Bielefeld, Bielefeld, 4800, Fed. Rep. Ger.). Chem. Uses Molybdenum, Proc. Int. Conf., 3rd, 59-63. Editor(s): Barry, H. F.; Mitchell, P. C. H. Climax Molybdenum Co.: Ann Arbor, Mich. (English) 1979. CODEN: 43RZAV.

AB Novel S-rich Mo compds. with the anions [Mo3S(S2)6]2-, [Mo2(S2)6]2-, [Mo2O2S2(S2)2]2-, and [Mo4(NO)4S3(S2)5]4- are reported. The 1st 3 are obtained by means of an interesting redn. of Mo(VI) by Sx2- in aq. soln. The investigation shows the high affinity of Mo in different oxidn. states for S and esp. for S22-.

IT **67031-31-6P**
(prepn. of)

RN 67031-31-6 HCA

CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)



●2 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75

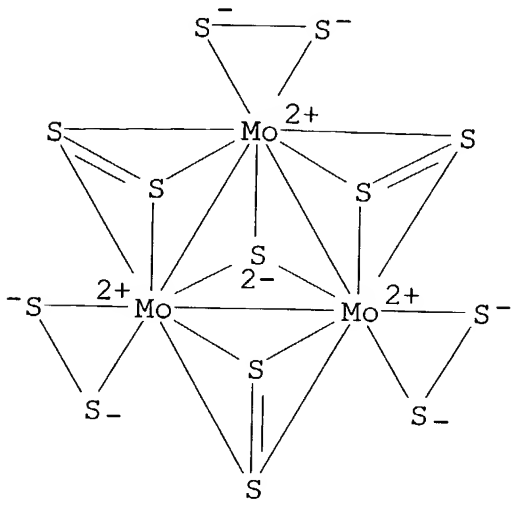
IT **67031-31-6P** 68417-00-5P
(prepn. of)

L28 ANSWER 19 OF 20 HCA COPYRIGHT 2004 ACS on STN

90:145172 Simple preparation of the binary metal-sulfur clusters [Mo3S13]2- and [Mo2S12]2- from MoO42- in practically quantitative yield. Mueller, Achim; Bhattacharyya, Ram Gopal; Pfefferkorn, Bernhard (Fak. Chem., Univ. Bielefeld, Bielefeld, Fed. Rep. Ger.). Chemische Berichte, 112(2), 778-80 (German) 1979. CODEN: CHBEAM. ISSN: 0009-2940.

AB (NH4)2[Mo3S(S2)6] and (NH4)2[Mo2(S2)6].2H2O were prepd. by heating aq. MoO42- with (NH4)2Sx for several h.

IT **67031-31-6P**
(prepn. of)
RN 67031-31-6 HCA
CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)

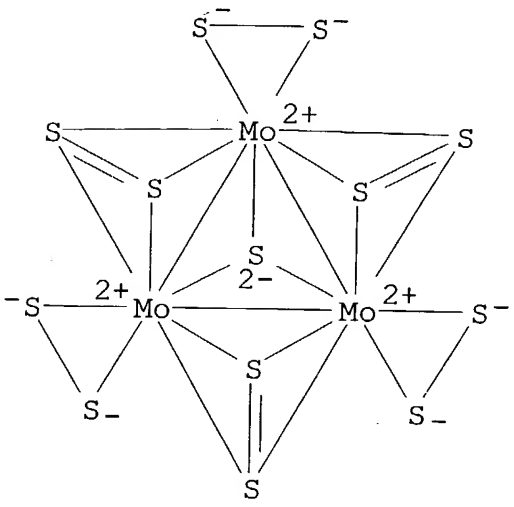


● 2 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
IT **67031-31-6P** 68417-00-5P
(prepn. of)

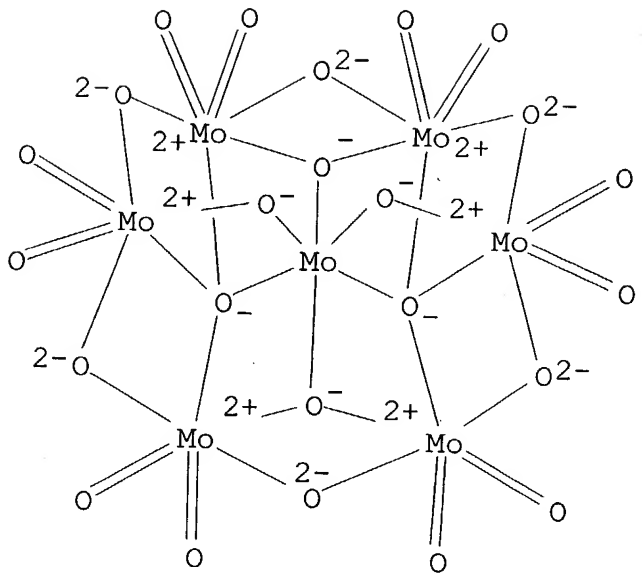
L28 ANSWER 20 OF 20 HCA COPYRIGHT 2004 ACS on STN
89:83976 Directed synthesis of tridecathiotrimolybdate(2-), an isolated cluster with sulfur atoms in three different bonding states. Mueller, Achim; Sarkar, Sabyasachi; Bhattacharyya, Ram Gopal; Pohl, Siegfried; Dartmann, Mechthild (Fak. Chem., Univ. Bielefeld, Bielefeld, Fed. Rep. Ger.). Angewandte Chemie, 90(7), 564-5 (German) 1978. CODEN: ANCEAD. ISSN: 0044-8249.
AB The Mo(IV) complex (NH4)2[Mo3S(.mu.-S2)3(S2)3] (I) was prepd. by reaction of an aq. soln. of (NH4)6Mo7O24.4H2O and NH2OH.HCl with a satd. soln. of (NH4)2Sx or by direct reaction of MoCl4(py)2 with the polysulfide soln. I was characterized by chem. anal., thermogravimetry, DTA, magnetic measurements, single crystal structure anal., and ESCA, electronic, IR, and Raman spectra. I is very stable and it is insol. in H2O but somewhat sol. in DMF. In I the Mo-Mo distance is 2.67 .ANG. and the coordination no. is 9.

IT **67031-31-6P**
(prepn. and structure)
RN 67031-31-6 HCA
CN Molybdate(2-), tris[.mu.-(disulfur-.kappa.S,.kappa.S':.kappa.S,.kappa.S')]tris(dithio)-.mu.3-thioxotri-, triangulo, diammonium (9CI) (CA INDEX NAME)



● 2 NH_4^+

IT **12027-67-7**
(reaction of, with hydroxylamine and ammonium polysulfide)
RN 12027-67-7 HCA
CN Molybdate ($Mo_7O_{24}^{6-}$), hexaammonium (9CI) (CA INDEX NAME)



● 6 NH_4^+

CC 78-7 (Inorganic Chemicals and Reactions)
IT **67031-31-6P**
(prepn. and structure)
IT **12027-67-7**
(reaction of, with hydroxylamine and ammonium polysulfide)